

United States
Circuit Court of Appeals
For the Ninth Circuit.

FRANS VAN DER GRINTEN and CHARLES
BRUNING COMPANY, INC., a Corporation,
Appellants,
VS.

DIETERICH-POST COMPANY, a Corporation,
Appellee.

Transcript of Record

Upon Appeal from the District Court of the United
States for the Northern District of California,
Southern Division.

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INDEX

[Clerk's Note: When deemed likely to be of an important nature, errors or doubtful matters appearing in the original certified record are printed literally in *italic*; and, likewise, cancelled matter appearing in the original certified record is printed and cancelled herein accordingly. When possible, an omission from the text is indicated by printing in *italic* the two words between which the omission seems to occur.]

	Page
Amended complaint	1
Amended answer	7
Appeal:	
order allowing	450
bond on	451
petition for	445
Assignment of errors	446
Bond on appeal	451
Citation	463
Clerk's certificate	462
Conclusions of law, findings of fact and.....	36
Defendant's exceptions to findings of fact.....	48
Errors, assignment of	446
Exhibits for defendant:	
A—German patent to Kalle No. 526,370, with translation	128
B—File wrapper and contents patent 1,- 735,059, 4/1/30 to Humphrey Des- mond Murray	66

Index	Page
Exhibits for defendant (contd.):	
C—Printed copy U. S. patent 1,444,469, 2/6/23, to Kalle & Co. (Kogel, in- ventor.)	66
D—German patent 427,570, 1/7/25, to E. Gronau, with translation	67
E—U. S. Patent 1,803,906, dated 5/5/31, to Kalle & Co.	283
F—Lietz paper	417
G—Post #500 paper	418
H—Dietzgen paper	418
I—Post #500 paper with Post developer and washed in hypo.	418
J—Letter from Lietz Co. to Duncan.....	420
K—Print made from Bruning paper.....	421
L—Print made from Bruning paper.....	421
M—Print made from Bruning paper and developer	426
N—Letter, Renker-Belipa, 2/13/24, to Dieterich-Post	431
O—Brown line print washed in plain water and not washed in hypo.....	434
P—Brown line print washed with water and also washed in hypo and then again in water	435

Index

Page

Exhibits for defendant (contd.):

Q—Print made of 500 direcprint paper and developed with Defendant's developer and not washed in water	435
--	-----

Exhibits for Plaintiffs:

1 Letters Patent No. 1,821,281 to Van der Grinten	65
2 Letters Patent No. 1,841,653 to Van der Grinten	65
3 Certified copy file wrapper and con- tents, Patent No. 1,821,281 to Van der Grinten	65
4 Certified copy file wrapper and con- tents, Patent No. 1,841,653 to Van der Grinten	66
5 Stipulation as to receipt of notice of Infringement and also as to sale by Defendant	66
6 (Omitted as it consists of Plaintiffs' Interrogatories and Defendants' Answers thereto which are a part of the permanent Record of the District Court, and the pertinent portion of which was read into the Record at the request of the trial Judge)	66

	Index	Page
Exhibits for plaintiffs (contd.):		
7	Chart of prior art	83
8	Chart entitled "Invention in Patent 1,821,281"	83
9	Title page and pages 506 and 902 of "Modern Inorganic Chemistry" by J. W. Mellor, 1927.....	95
10	Rathke article in <i>Berichte</i> , 1884, pages 297 to 309, inclusive.....	95
11	Pages 10 and 11 of Dictionary of Chemical Terms by James H. Couch and title page and page 92 of Funk and Wagnalls Dictionary	98
12	Chart of Thiourea	98
13	Certified copy of Holland applica- tion filed December 11, 1926 and translation of same	100
14	Certified copy of Holland applica- tion filed February 10, 1927, and translation of same	100
15	Certified copy of Holland applica- tion filed March 16, 1927 and trans- lation of same	100
16	Certified copy of Holland applica- tion filed May 23, 1928, and trans- lation of same	112
17	German patent 56,606, with transla- tion	116

	Index	Page
Exhibits for plaintiffs (contd.):		
18	Andersen article, Photographic Correspondenz	116
19	Ruff and Stein article, pages 1668 and 1670 "Berichte" 34, 1901, with translation thereof	116
20	British patent 210,862	116
21	British patent 234,818	116
22	Circular "Black and White Magic" and booklet "B. W. Instruction Manual"	205
23	Infringement letter	206
24	Packers memo. and invoice	206
25	Labels attached to Defendant's paper	207
26	Directions for using Defendant's developer and paper	207
27	Specimen piece of Defendant's Di-epo Direcprint paper	207
28	Specimen of Defendant's developer..	208
29	Chart, analysis of Defendant's paper	217
30	Specimen of finished diazo type print with thiourea therein	218
31	Specimen of positive diazo type print having no thiourea therein.....	219

Index	Page
Exhibits for plaintiffs (contd.):	
32 Chart showing analysis of Defendant's Developer	231
33 Specimen of finished Diazo type print with sodium thiosulfate therein	232
34 Specimen of diazo type print containing thiourea and sodium thiosulfate	234
35 Chart showing apparatus for use in developing BW prints	240
36 Defendant's advertising folder showing device for applying developer..	240
Findings of fact and conclusions of law.....	36
Findings of fact, plaintiffs exceptions to.....	45
Interlocutory decree	53
Memorandum opinion	30
Names and addresses of attorneys.....	1
Order allowing appeal	450
Order and stipulation re printing of exhibits.....	464
Order re exhibits	456
Order settling and approving bill of exceptions..	344
Petition for appeal	445
Plaintiff's exceptions to findings of fact.....	45
Praecipe	456

Index	Page
Statement of evidence	64
Deposition for defendant:	
Loevenich, Dr. Josef	349
Witnesses for defendant:	
Duncan, Lee R.	
—direct	414
—cross	421
—redirect	426
—recross	428
Lazar, Arthur	
—direct	266
—cross	298
—redirect	342
—recross	346
Post, Rudolph C.	
—direct	430
Witnesses for plaintiffs:	
Klein, Hugo	
—direct	202
—cross	252
—redirect	262
—recross	264
Van der Grinten, Lodewijk Pieter Frans	
—direct	67
—cross	116
—redirect	189
—recross	198

Index	Page
Witnesses for plaintiffs (contd.):	
—redirect	199
—recross	201
—recalled, rebuttal, direct	436
—cross	443
Stipulation extending time for entry of decree	50
Stipulation for filing amended bill of complaint	7
Stipulation for approval of narrative statement of evidence	444
Stipulation relative to bill of particulars.....	51
Stipulation re printing transcript on appeal.....	455

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In the Southern Division of the United States District Court for the Northern District of California.

In Equity No. 3493-K.

FRANS VAN DER GRINTEN and CHARLES
BRUNING COMPANY, INC.,

Plaintiffs,

vs.

DIETERICH-POST COMPANY,

Defendant.

AMENDED BILL OF COMPLAINT.

To the Honorable Judges of the United States District Court for the Northern District of California, Southern Division.

FIRST: Frans Van der Grinten, of Venlo, Limburg, Netherlands and Charles Bruning Company,

Inc., a corporation of the State of New York, having its principal place of business at No. 102 Reade Street, New York City, N. Y., bring this, their bill of complaint, against Dieterich-Post Company, a corporation of the State of California, having its principal place of business at San Francisco, California, and for cause of action the plaintiffs say:

SECOND: This is a suit in equity arising under the Patent Laws of the United States for infringement of Patent No. 1,821,281, dated September 1st, 1931, for Manufacture of Diazo-Types and for infringement of Patent No. 1,841,653 dated January 19th, 1932, for Process for Developing Positive Diazo Prints.

THIRD: Plaintiffs allege, on information and belief, that prior to December 11, 1926, February 10, 1927, and March 16, 1927, the convention filing dates or the effective [1*] filing date of the application upon which said Patent No. 1,821,281 was granted, the inventors Karel Van der Grinten and Louis Van der Grinten named therein were the first, original and joint inventors of the improvements and invention covered by said Letters Patent, which improvements and invention were not known or used by others in this country before their invention or discovery thereof and were not patented or described in any printed publication in this or any foreign country before their invention or discovery thereof or more than two years prior to said filing date, and were not in public use or on sale in this

*Page numbering appearing at the foot of page of original certified Transcript of Record.

country for more than two years prior to said filing date, and which had not been abandoned nor patented nor caused to be patented by them or their legal representatives or assigns in any foreign country upon an application filed more than twelve months prior to said filing date, that on said filing date they duly filed in the United States Patent Office an application for Letters Patent for said invention, and that on said date of issue all other requirements of the Statutes of the United States then in force having been duly complied with, the said Letters Patent was issued on said application to the said Frans Van der Grinten, as assignee of said applicants, said Letters Patent is now in full force and effect and plaintiffs are ready here in court to produce it or a duly certified copy thereof.

FOURTH: Plaintiffs allege, on information and belief, that prior to August 22, 1927 and May 23, 1928, the convention filing dates or the effective filing date of the application upon which said Patent No. 1,841,653 was granted, the inventors Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten, named therein were the [2] first, original and joint inventors of the improvements and invention covered by said Letters Patent, which improvements and invention were not known or used by others in this country before their invention or discovery thereof and were not patented or described in any printed publication in this or any foreign country before their inven-

tion or discovery thereof or more than two years prior to said filing date, and were not in public use or on sale in this country for more than two years prior to said filing date, and which had not been abandoned nor patented nor caused to be patented by them or their legal representatives or assigns in any foreign country upon an application filed more than twelve months prior to said filing date, that on said filing date they duly filed in the United States Patent Office an application for Letters Patent for said invention, and that on said date of issue all other requirements of the Statutes of the United States then in force having been duly complied with, the said Letters Patent was issued on said application to the said Frans Van der Grinte, as assignee of said applicants, said Letters Patent is now in full force and effect and plaintiffs are ready here in court to produce it or a duly certified copy thereof.

FIFTH: By reason of the grants of the said patents Nos. 1,821,281 and 1,841,653, to Frans Van der Grinten, he now owns the entire right, title and interest in and to said patents and the inventions covered thereby, together with all the accrued rights of action, either at law or in equity for past infringements thereof, his right, title and interest being limited only to the extent set forth in the following paragraph. [3]

SIXTH: On August 1st, 1929, the said two plaintiffs entered into an agreement whereby Frans Van der Grinten granted to the other plaintiff

Charles Bruning Company, Inc., an exclusive license to make, use and sell the said patented inventions within the United States, its territories and possessions, which said exclusive license is in full force and effect and proof of which plaintiffs are ready here in court to produce.

SEVENTH: That by virtue of said exclusive license the plaintiff Frans Van der Grinten is the owner of the legal title to the said two patents and inventions and the plaintiff Charles Bruning Company, Inc., is the owner of the equitable title to said two patents and inventions, and that the latter is the real party in interest in this suit and the inventions patented in the said two patents are susceptible of joint use and practice.

EIGHTH: The inventions patented as aforesaid are of great commercial value and have been used extensively by the plaintiffs. The public in general, with the exception of said defendant, has recognized plaintiffs' rights thereunder and has acquiesced in the validity of said Letters Patents.

NINTH: Plaintiffs allege, on information and belief, that said defendant without the license or allowance of said plaintiffs, within six years last past in the Northern District of California, and elsewhere in the United States, has infringed said Letters Patents No. 1,821,281 and No. 1,841,653, wherefore plaintiffs have been damaged and defendant has profited.

TENTH: The defendant has been duly notified of [4] its infringement of said Letters Patents and

of plaintiffs' rights thereunder, but the defendant has continued to infringe and threatens to continue such infringement to the great loss and irreparable damage to the plaintiffs.

WHEREFORE, the plaintiffs pray:

1. That defendant be made to answer this bill of complaint, but not under oath, an answer under oath being hereby expressly waived.

2. For writ of injunction as well preliminary as permanent, issuing out of and under the seal of this court, enjoining and restraining said defendant, its officers, agents, servants and workmen from further infringement of said patent.

3. For costs and an accounting of profits and damages and that the damages assessed may be trebled.

4. For such other and further relief as the circumstances of the case may require.

Dated, March 30, 1935.

FRANS VAN DER GRINTEN and
CHARLES BRUNING COMPANY, INC.,

By WM. S. GRAHAM,
Their Solicitor.

WM. S. GRAHAM,

57 Post St., San Francisco,

Attorney for Plaintiffs.

WRAY N. HOFFMAN,

IVAN E. A. KONIGSBERG,

Of Counsel. [5]

STIPULATION FOR FILING AMENDED
BILL OF COMPLAINT.

IT IS HEREBY STIPULATED that the foregoing Amended Bill of Complaint may be filed, subsequent to the trial of the cause, in lieu of original Bill of Complaint filed January 27, 1933, and its subsequent Amendments, for the purpose of consolidating Plaintiff's original Bill of Complaint and Amendments thereto into one pleading for the purpose of simplifying record on Appeal in case Appeal shall be taken by either party.

WRAY N. HOFFMAN

WM. S. GRAHAM

Attorneys for Plaintiffs

ASA G. KAZEBEER

ARLINGTON C. WHITE

Attorneys for Defendant

Approved and so ordered this 8 day of April,
1935.

A. F. ST. SURE

United States District Judge.

[Endorsed]: Filed Apr. 8, 1935. [6]

[Title of Court and Cause.]

AMENDED ANSWER TO PLAINTIFFS'
BILL OF COMPLAINT.

Comes now the defendant, and for answer to plaintiffs' Bill of Complaint filed in the above entitled cause, or to so much or such parts thereof

as it is advised it is necessary or material for it to make answer unto, and reserving unto itself all manner of benefit and advantage, by exception or otherwise, which can or may be had or taken to the manifold errors, insufficiencies and uncertainties and imperfections in said Bill of Complaint contained, and answering says:

Defendant denies each and every allegation in said Bill of Complaint contained, except as hereinafter admitted or specifically answered or avoided, and demands strict proof of each and every such allegation.

Defendant now makes answer to the Bill of Complaint by paragraphs as follows:

I.

Answering Paragraph "First" of the Bill of Complaint, defendant alleges that it is without knowledge, and is not informed, except by the Bill of Complaint herein, as to whether or not Frans Van der Grinten is a resident of Venlo, Limburg, Netherlands, or [7] whether or not plaintiffs, Charles Bruning Company Inc. is a corporation of the State of New York, having its principal place of business at No. 102 Reade Street, New York City, N. Y., and therefore leaves plaintiffs to their proofs thereon; admits that it is a corporation, duly organized and existing under the laws of the State of California, having its principal place of business at San Francisco, California.

II.

Answering Paragraph "Second" of the Bill of Complaint, defendant admits the jurisdiction of this Honorable Court and that this suit is brought for an alleged infringement of Patent No. 1,821,281, dated September 1st, 1931, for Manufacture of Diazo-Types and for infringement of Patent No. 1,841,653, dated January 19th, 1932, for Process for Developing Positive Diazo Prints, but denies that it has in any way infringed said Letters Patent, or either thereof.

III.

Answering Paragraph "Third" of the Bill of Complaint, defendant denies that Karel Van der Grinten and Louis Van der Grinten were, or that either of them was, within the meaning of the Statutes of the United States, in force on the 6th day of June, 1927, or at any time, the first, original and joint inventors, or the first, or the original, or the joint inventors, or that either of them was the sole inventor of the alleged improvements and alleged invention, or the alleged improvements, or the alleged invention alleged to be covered by said alleged Letters Patent No. 1,821,281; denies that said Karel Van der Grinten and Louis Van der Grinten were, or that either of them was entitled to a patent thereunder under the provisions of said Statutes; and denies each and every, all and singular, all the other allegations contained in said Paragraph "Third" [8] of said Bill of Complaint.

IV.

Answering Paragraph "Fourth" of the Bill of Complaint, defendant denies that Lodewijk Pieter Frans Van der Grinten and Karel Jan Joseph Van der Grinten were, or that either of them was, within the meaning of the Statutes of the United States, in force on the 11th day of August, 1928, or at any time, the first, original and joint inventors, or the first, or the original, or the joint inventors, or that either of them was the sole inventor of the alleged improvements and alleged invention, or the alleged improvements, or the alleged invention alleged to be covered by said alleged Letters Patent No. 1,841,653; denies that said Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten were, or that either of them was entitled to a patent thereunder under the provisions of said Statutes; and denies each and every, all and singular, all the other allegations contained in said Paragraph "Fourth" of said Bill of Complaint.

V.

Answering Paragraph "Fifth" of said Bill of Complaint defendant denies each and every, all and singular, the allegations contained in Paragraph "Fifth" of said Bill of Complaint.

VI.

Answering Paragraph "Sixth" of said Bill of Complaint, defendant denies each and every, all and singular, the allegations therein contained.

VII.

Answering Paragraph "Seventh" of said Bill of Complaint, defendant denies each and every, all and singular, the allegations therein contained. [9]

VIII.

Answering Paragraph "Eighth" of said Bill of Complaint, defendant denies that said alleged inventions alleged to have been patented, as set forth in said Bill of Complaint, are of great, or any commercial value; and denies that said alleged inventions have been used extensively by the plaintiffs; and denies that the public in general, with the exception of defendant, has recognized plaintiffs' rights thereunder; and denies that the public in general, with the exception of defendant, has acquiesced in the validity of said Letters Patents described or referred to in said Complaint.

IX.

Answering Paragraph "Ninth" of the Bill of Complaint, defendant denies that it has infringed upon said Letters Patents, or either thereof, within the Northern District of California and/or elsewhere in each, or any of the several states of the United States of America; and also denies any infringement whatsoever of any rights of the plaintiffs, or either of them, in the premises, and further denies that any act, or intended act, or manufacture, or sale, or use of Diazo-Types and/or any processes for developing positive Diazo-Prints by the defend-

ant, is in violation of any legal right of the plaintiffs, or either of them, in the premises.

X.

Answering Paragraph "Tenth" of the Bill of Complaint, defendant admits that it has received written notice of said Letters Patents from plaintiffs' counsel prior to the filing of this suit, but denies that it has infringed, or that it has threatened, or is now threatening to continue to infringe said Letters Patent, or either thereof, and [10] also denies that the plaintiffs, or either of them, has suffered any loss and/or damage whatsoever by reason of any wrongful act or infringement by the defendant in the premises.

XI.

Further answering, defendant, upon information and belief, avers that said Letters Patent No. 1,821,281 is invalid and void for the following reasons:

(A) Because prior to the alleged invention by the said Karel Van der Grinten and Louis Van der Grinten, or either of them, of the alleged improvements therein described and claimed, or more than two years prior to their application for Letters Patent therefor, the said alleged improvements, or all material and substantial parts thereof, had been patented or described in printed publications as follows, to-wit:

UNITED STATES LETTERS PATENT

Number	Patentee	Date
1,444,469	Kalle & Co.	February 6, 1923
1,483,797	Green et al.	February 12, 1924
1,587,270	Beebe, et al.	June 1, 1926
1,752,174	Hall	March 25, 1930
1,753,708	Lehmann	April 8, 1930

BRITISH LETTERS PATENT

7,453	Green, Cross et al.	April 18, 1891
10,766	Abel	April 13, 1895
210,862	Kalle & Co.	February 7, 1924
238,704	Imray	August 27, 1925

[11]

DUTCH LETTERS PATENT

14,150	Kalle & Co.	January 15, 1926
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FRENCH LETTERS PATENT

Add. 30,585	Kalle & Co.	April 6, 1926
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GERMAN LETTERS PATENT

53,455	Feer	August 19, 1890
56,606	Green, et al.	April 8, 1891
379,998	Kalle & Co.	Aug. 31, 1923
386,433	Kalle & Co.	Dec. 8, 1923

DANISH LETTERS PATENT

33,465		July 21, 1924
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PUBLICATIONS

Photographic Correspondenz by Andresen, 1895.

Ruff & Stein-Berichte 34, 1901, 1668.

Eders Jahrbuch fur Photographie, 1896, page 261.

Photographische Korrespondenz, June Issue, 1895.

Photochemische Studien 1894, Page 45.

Photographische Mitteilungen, Part 37, Page 263.

Journal of the Chem. Soc. 1907, page 35.

The Amateur Photographer, 1907, page 148.

Berliner Berichte 1902, Part 34, Page 1668.

Kodak Abstracts 1924, page 29.

Plotnikow, Lehrbuch der Allgemeinen Photochemie, 1920, page 540, et seq.

Eder-Ausfuhrliches Handbuch der Photographie, 1926, Vol. 4, Part 2, page 469 et seq. [12]

Anleitung zur Herstellung von negativen und positiven Lichtpausen von G. Mercator. Druck und Verlag von Wilhelm Knapp, Halle, a.d.s. 1899 (Information for making negative and positive light prints by G. Mercator—printed and published by Wilhelm Knapp, Halle a.d.s. 1899, pages 50 to 53 incl.)

Chemie en Industrie Bijblad van het Chemisch Weekblad (Dutch) July 23, 1927.

Chemie en Industrie Bijblad van het Chemisch Weekblad (Dutch) August 13, 1927.

Deutscher Buch und Steindrucker, Oct. 1924, page 62.

Creative Chemistry, by Edwin E. Slosson, Oct. 1919, pp. 88, 89.

Chemistry in Industry, Vol. I, 1924, pp. 319-328 inclusive, of article entitled "Photography or Picture Making by Light".

Industrial Organic Chemistry by Sadtler and Matos, 5th Ed. (1923), pp. 511, 611.

(B) Because prior to the alleged invention by the said Karel Van der Grinten and Louis Van der Grinten of the alleged improvements described and claimed, the same, or all material and substantial part or parts thereof had been known and used by others in the United States, and particularly by the following, to-wit:

(1) The patentees and assignees of the patents listed in XI (A) of this Answer, of and at the places of residence appearing on such patents, and elsewhere in the United States.

(2) Eugene Dietzgen Co., 523 Market Street, San Francisco, California,

(3) Kauffel & Esser Co., 30 - 2nd Street, San Francisco, California.

(4) A. Lietz Co., 61 Post Street, San Francisco, California,

(5) Frederick Post Company, Hamlin & Avondale Avenues, Chicago, Illinois.

(6) Pacific Gas & Electric, 245 Market Street, San Francisco, California, [13]

(7) Pacific Telephone & Telegraph Company, 140 New Montgomery Street, San Francisco, California.

(8) Brownline Process Co., 1123 Pike Street, Seattle, Washington,

(9) J. H. Weil, 1315 Cherry Street, Philadelphia, Pennsylvania,

(10) Oliver A. Hall, 7510 East Greenlake Way, Seattle, Washington, and

(11) Eastman Kodak Company, 241 Battery Street, San Francisco, California,

and by others whose names, residences and the places of knowledge and use defendant begs leave to affix hereto hereafter, by amendment or other wise, when it has fully ascertained the same.

(C) Because more than two years prior to the filing of application for said Letters Patent, 1,821,281 the alleged invention had been in public use or on sale within the United States, and particularly by the persons and/or companies named in the preceding sub-paragraph (B) hereof, and by others whose names, residences and the places of knowledge and use defendant begs leave to affix hereto hereafter, by amendment or otherwise, when it has fully ascertained the same.

XII.

Further answering, defendant, upon information and belief, avers that said Letters Patent No. 1,841,653 is invalid and void for the following reasons:

(A) Because prior to the alleged invention by the said Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten, or either of them, of the alleged improvements therein described and claimed, or more than two years prior

to their application for Letters Patent therefor, the said alleged improve- [14] ments, or all material and substantial parts thereof, had been patented or described in printed publications as follows, to-wit:

UNITED STATES LETTERS PATENT

Number	Patentee	Date
1,057,712	Crompton	April 1, 1913
1,169,096	Thornton	January 18, 1916
1,202,921	Trabue	October 31, 1916
1,444,469	Kalle & Co.	February 6, 1923
1,483,797	Green et al.	February 12, 1924
1,587,270	Beebe et al.	June 1, 1926
1,724,666	Kogel	August 13, 1929
1,752,174	Hall	March 25, 1930
1,753,708	Lehmann	April 8, 1930
1,756,400	Kalle & Co.	April 29, 1930
1,841,801	Gay	Jan. 19, 1932
1,843,822	Kogel	Feb. 2, 1932

GERMAN LETTERS PATENT

427,570	Gronau	April 10, 1926
441,888	Winkler et al.	March 15, 1927

DANISH LETTERS PATENT

33,465		July 21, 1924
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PUBLICATIONS

Photographic Correspondenz by Andresen, 1895.

Ruff & Stein—Berichte 34, 1901, 1668. [15]

Eders Jahrbuch fur Photographie, 1896, page 261.

Photographische Korrespondenz, June Issue, 1895.

Photochemische Studien 1894, Page 45.

Photographische Mitteilungen, Part 37, Page 263.

Journal of the Chem. Soc. 1907, page 35.

The Amateur Photographer, 1907, page 148.

Berliner Berichte 1902, part 34, page 1668.

Kodak Abstracts 1924, page 29.

Plotnikow, Lehrbuch der Allgemeinen Photochemie, 1920, page 540, et seq.

Eder-Ausführliches Handbuch der Photographie, 1926, Vol. 4, Part 2, page 469 et seq.

Anleitung zur Herstellung van negativen und positiven Lichtpausen von G. Mercator. Druck und Verlag von Wilhelm Knapp, Halle, a.d.s. 1899 (“Information for making negative and positive light prints by G. Mercator—printed and published by Wilhelm Knapp, Halle a.d.s. 1899, pages 50 to 53 incl.”)

Chemie en Industrie Bijblad van het Chemisch Weekblad (Dutch) July 23, 1927.

Chemie en Industrie Bijblad van het Chemisch Weekblad (Dutch) August 13, 1927.

Deutscher Buch und Steindruckerei, Oct. 1924, page 62. [16]

Creative Chemistry, by Edwin E. Slosson, October 1919, pp. 88, 89.

Chemistry in Industry, Vol. I, 1924, pp. 319-328 inclusive, of Article entitled “Photography, or Picture Making by Light”.

Industrial Organic Chemistry by Sadtler and Matos, 5th Ed. (1923), pp. 511, 611.

(B) Because prior to the alleged invention by the said Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten of the alleged improvements described and claimed, the same, or all material and substantial part or parts thereof had been known and used by others in the United States, and particularly by the following, to-wit:

(1) The patentees and assignees of the patents listed in Paragraph XII (A) of this Answer, of and at the places of residence appearing on such patents, and elsewhere in the United States.

(2) Eugene Dietzgen Co., 523 Market Street, San Francisco, California,

(3) Kauffel & Esser Co., 30 - 2nd Street, San Francisco, California,

(4) A. Lietz Co., 61 Post Street, San Francisco, California,

(5) Frederick Post Company, Hamlin & Avondale Avenues, Chicago, Illinois,

(6) Pacific Gas & Electric, 245 Market Street, San Francisco, California,

(7) Pacific Telephone & Telegraph Company, 140 New Montgomery Street, San Francisco, California,

(8) Brownline Process Co., 1123 Pike Street, Seattle, Washington, [17]

(9) J. H. Weil, 1315 Cherry Street, Philadelphia, Pennsylvania,

(10) Oliver A. Hall, 7510 East Greenlake Way, Seattle, Washington,

(11) Eastman Kodak Company, 241 Battery Street, San Francisco, California, and by others whose names, residences and the places of knowledge and use defendant begs leave to affix hereto thereafter, by amendment or otherwise, when it has fully ascertained the same.

(C) Because more than two years prior to the filing of application for said Letters Patent, No. 1,841,653, the alleged invention had been in public use or sale within the United States, and particularly by the persons and/or companies named in the preceding sub-paragraph (B) hereof, and by others whose names, residences and the places of knowledge and use defendant begs leave to affix hereto hereafter, by amendment or otherwise, when it has fully ascertained the same.

XIII.

Further answering, defendant avers upon information and belief, that the alleged improvements or invention purporting to be covered by said Letters Patent No. 1,821,281 were not, nor were any of them new and useful at the time of the alleged invention thereof by said Karel Van der Grinten and Louis Van der Grinten, and were wholly devoid of value and utility and are not the subject matter of valid Letters Patent.

XIV.

Further answering, defendant avers upon information and belief, that the alleged improvements or invention purporting to be covered by said Let-

ters Patent No. 1,841,653 were not, nor were any of them new and useful at the time of the alleged invention thereof by said Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten, and were wholly devoid of value and utility and are not the subject matter of valid Letters Patent. [18]

XV.

Further answering, defendant avers upon information and belief, that the alleged improvements or invention purporting to be covered by said Letters Patent No. 1,821,281, and particularly the claims thereof, were devoid of substantial novelty or invention in view of the well known state of the art as shown by the prior patents and publications and prior knowledge and use by others, all as hereinabove in this answer set forth, as well as other practices commonly known to and used by the public, particularly with reference to the manufacture of diazo-types and the developing of positive diazo-prints long prior to the alleged invention thereof by the said Karel Van der Grinten and Louis Van der Grinten, or either of them, and did not constitute patentable subject matter of invention or discovery within the meaning of the Patent Laws. Wherefore, said claims, and each and all thereof, in said Letters Patent No. 1,821,281, is invalid and void.

XVI.

Further answering, defendant avers upon information and belief, that the alleged improvements or

invention purporting to be covered by said Letters Patent No. 1,841,653, and particularly the claims thereof, were devoid of substantial novelty or invention in view of the well known state of the art as shown by the prior patents and publications and prior knowledge and use by others, all as hereinabove in this answer to set forth, as well as other practices commonly known to and used by the public, particularly with reference to the manufacture of diazo-types and the developing of positive diazo-prints long prior to the alleged invention thereof by the said Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten, or either of them, and did not constitute patentable subject matter of invention or discovery within the [19] meaning of the Patent Laws. Wherefore, said claims, and each and all thereof, in said Letters Patent No. 1,841,653, is invalid and void.

XVII.

Defendant further answering, avers upon information and belief that said Letters Patent No. 1,821,281 does not, nor does any claim thereof disclose patentable subject matter within the meaning of the Patent Laws, and that on the contrary, said Letters Patent sets forth and describes only old and familiar means of common knowledge and use long prior to the alleged invention thereof by said Karel Van der Grinten and Louis Van der Grinten, or either of them, and which were within the reach and at the disposal of any person working in the manu-

facturing or using of diazo-types and/or diazo-prints, or of any person desiring to use the same at the time of and for use before the alleged invention thereof by the said Karel Van der Grinten and Louis Van der Grinten, and that the details thereof represent only ordinary skill of chemistry, photography, and the developing of diazo-prints commonly employed in the industry to which the alleged invention of said Letters Patent pertains, wherefore, said Letters Patent are invalid and void.

XVIII.

Defendant further answering, avers upon information and belief that said Letters Patent No. 1,-841,653 does not, nor does any claim thereof disclose patentable subject matter within the meaning of the Patent Laws, and that on the contrary, said Letters Patent sets forth and describes only old and familiar means of common knowledge and use long prior to the alleged invention thereof by said Lodewijk Pieter Frans Van der Grinten and Karl Jan Josef Van der Grinten, or either of them, and which were [20] within the reach and at the disposal of any person working in the manufacturing or using of diazo-types and/or diazo-prints, or of any person desiring to use the same at the time of and for use before the alleged invention thereof by the said Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten, and that the details thereof represent only ordinary skill of chemistry, photography, and the developing of diazo-prints

commonly employed in the industry to which the alleged invention of said Letters Patent pertains, wherefore, said Letters Patent are invalid and void.

XIX.

Defendant further answering avers upon information and belief, that the claim of said Letters Patent No. 1,821,281 is so limited and restricted by the prior art, as well as by the actions of said Karel Van der Grinten and Louis Van der Grinten in prosecuting the application therefor, and particularly by the limitations and restrictions made therein under the requirements of the Commissioner of Patents before said application was allowed, that said claim of said Letters Patent is now specifically limited and restricted to the particular uses therein described and that plaintiffs are estopped to claim a broader construction for such claims.

XX.

Defendant further answering, avers upon information and belief, that the claim of said Letters Patent No. 1,841,653 is so limited and restricted by the prior art, as well as by the actions of said Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten in prosecuting the application therefor, and particularly by the limitations and restrictions made therein under the requirements of the Commissioner of Patents before said [21] application was allowed, that said claim of said Letters Patent is now specifically limited and restricted to the particular uses therein described

and that plaintiffs are estopped to claim a broader construction for such claims.

XXI.

Defendant further answering, avers upon information and belief, that the said Karel Van der Grinten and Louis Van der Grinten were not, nor was either of them, the original, first and/or the sole inventor or discoverer of the alleged improvements purported to be covered by said Letters Patent No. 1,821,281, or of any material or substantial parts thereof, but that the said Karel Van der Grinten and Louis Van der Grinten surreptitiously and unjustly obtained said Letters Patent No. 1,821,281 for that which was not their own invention or discovery, nor the invention or discovery of either of them, but which was in fact made by others who were using reasonable diligence in adapting and perfecting the same, to-wit, the parties set forth in paragraph XI (A) of this answer, and the persons or companies set forth in paragraph XI (B) of this answer, and those whose names are not now definitely known to defendant but which defendant prays leave to affix hereto hereafter, by amendment or otherwise, after having ascertained the same.

XII.

Defendant further answering, avers upon information and belief, that the said Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten were not, nor was either of them, the

original, first and/or the sole inventor or discoverer of the alleged improvements purported to be covered by said Letters Patent No. 1,841,653, or of any material or substantial parts thereof, but that the said Lodewijk Pieter Frans Van der [22] Grinten and Karel Jan Josef Van der Grinten surreptitiously and unjustly obtained said Letters Patent No. 1,841,653 for that which was not their own invention or discovery, nor the invention or discovery of either of them, but which was in fact made by others who were using reasonable diligence in adapting and perfecting the same, to-wit, the parties set forth in paragraph XII (A) of this answer, and the persons or companies set forth in paragraph XII (B) of this answer, and those whose names are not now definitely known to defendant but which defendant prays leave to affix hereto hereafter, by amendment or other wise, after having ascertained the same.

XXIII.

Defendant further answering, avers upon information and belief, that the specification of said Letters Patent No. 1,821,281 is incomplete and ambiguous and does not describe the useful and patentable invention or inventions, nor describe the manufacture of diazo-types or diazo-prints and/or the manner of using the alleged process or invention, or the alleged improvements referred to and/or the constituent elements thereof in such full, clear and exact terms as to enable any person skilled in the alleged art or science to which the same pertains to

make and use the same, wherefore said Letters Patent are invalid and void.

XXIV.

Defendant further answering, avers upon information and belief, that the specification of said Letters Patent No. 1,841,653 is incomplete and ambiguous and does not describe the useful and patentable invention or inventions, nor describe the manufacture of diazo-types or diazo-prints and/or the manner of using the alleged process or invention, or the alleged improvements referred to, and/or the constituent elements thereof in [23] such full, clear and exact terms as to enable any person skilled in the alleged art or science to which the same pertains to make and use the same, wherefore said Letters Patent are invalid and void.

XXV.

The defendant, further answering, avers that the Letters Patent No. 1,821,281 are void as the claims thereof are for nonpatentable aggregation as distinguishable from a patentable combination.

XXVI.

The defendant, further answering, avers that the Letters Patent No. 1,841,653 are void as the claims thereof are for non-patentable aggregation as distinguishable from a patentable combination.

XXVII.

Alleges that the claims set forth in Letters Patent No. 1,821,281 are not distinct.

XXVIII.

Alleges that the claims set forth in Letters Patent No. 1,841,653 are not distinct.

XXIX.

Alleges that Karel Van der Grinten and Louis Van der Grinten during the prosecution in the Patent Office attempted to expand a simple invention of a distinct process into all embracing claims calculated by wide, generous and ambiguous language to discourage the further invention in the same department of industry and to cover antecedent inventions.

XXX.

Alleges that Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten during the prosecution in the [24] Patent Office attempted to expand a simple invention of a distinct process into all embracing claims calculated by wide, generous and ambiguous language to discourage the further invention in the same department of industry and to cover antecedent inventions.

XXXI.

That said Letters Patents referred to in plaintiffs' Bill of Complaint and each of said Letters Patents contains a repetition of substantially the

same claim in different words, and that each of said Letters Patents contains specifications which, by ambiguity and a needless multiplication of nebulous claims, is calculated to deceive and mislead the public.

WHEREFORE, defendant prays to be hence dismissed with its costs and charges in this behalf most wrongfully sustained.

DIETERICH-POST COMPANY

By JAMES W. DIETERICH

Vice-Pres.

ASA G. KAZEBEER

Solicitor for Defendant.

PAUL D. FLEHR

ARLINGTON C. WHITE

of Counsel

Crocker Bldg.

San Francisco [25]

STIPULATION FOR FILING AMENDED
ANSWER TO PLAINTIFFS' BILL
OF COMPLAINT

IT IS HEREBY STIPULATED that the foregoing Amended Answer to Plaintiffs' Bill of Complaint may be filed, subsequent to the trial of the cause, in lieu of Defendant's original Answer to Plaintiffs' Bill of Complaint filed on or about March 20, 1933, and subsequent amendments thereto, for the purpose of consolidating Defendant's original Answer and amendments thereto into one plead-

ing for the purpose of simplifying record on Appeal, in case Appeal be taken by either party.

ASA G. KAZEBEER

ARLINGTON C. WHITE

Attorneys for Defendant

WRAY N. HOFFMAN

WM. S. GRAHAM

Attorneys for Plaintiffs

Approved and so ordered this 8th day of April, 1935.

A. F. ST. SURE

United States District Judge

[Endorsed]: Filed April 8, 1935. [26]

[Title of Court and Cause.]

Before Kerrigan, District Judge.

Ivan E. A. Konigsberg, Esq., of New York City, New York, Wray N. Hoffman, Esq., of Washington, D. C. and W. S. Graham, Esq., of San Francisco, California, solicitors for plaintiffs. Messrs. Arlington C. White and Asa G. Kazebeer, of San Francisco, California, solicitors for defendant.

MEMORANDUM OPINION.

There are some phases of this case which call for comment in addition to my rulings on the allowance of contested findings.

I believe that plaintiffs' patents No. 1,821,281 and No. 1,841,653 are valid and that the claims of patent No. 1,821,281 when read in connection with the specifications and the examples given are not unwarrantedly broad. Plaintiffs' Finding 13, the first of those not stipulated, is allowed with the following changes: (1) strike from line 3 thereof the words "remains white" and substitute the words "resists discoloration to an appreciable extent"; (2) at the end of the finding after the word "prints", change the period to a comma and add "the light sensitive layer containing a reducing agent."

Plaintiffs' finding 14 is allowed with the following changes: (1) in line 3 of said finding strike out the words "stays white" and substitute the words "resists discoloration [27] to an appreciable extent"; and (2) at the end of the finding after the word "prints", change the period to a comma and add "the light sensitive layer containing a reducing agent."

Plaintiffs' findings 15 and 16 are allowed.

As to the validity of the second patent No. 1,841,653, I do not believe that the first Kalle patent, U. S. No. 1,444,469 and the Gronau German patent No. 427,570 taken together anticipate this patent or render it invalid because of the disclosures therein. Accordingly Plaintiffs' findings Nos. 17-20, inclusive are allowed.

On the issue of infringement of the first patent there are two fundamental questions. First, is the thiourea present in the light sensitive layer of the

Diepo paper sold by defendant a reducing agent? Second, does the patent cover inorganic reducing agents such as the sodium thiosulphate used in defendant's developer as well as organic reducing agents? Plaintiffs' experiment indicates that thiourea resists discoloration to some extent, but that is not the test. Plaintiffs' patent covers the process of arresting discoloration only when accomplished by introducing a reducing agent at some stage of making the print so that it is present in the background of the finished print. Plaintiffs' theory of this invention is that the discoloration of the backgrounds is due to the oxidation resulting from exposure to the atmosphere, and that a reducing agent which remains colorless when oxidized counteracts the tendency of the chemicals in the background to themselves, oxidize and darken. Is thiourea such a reducing agent? I do not believe that the evidence shows that it is. It may be that there are circumstances in which thiourea acts as a reducing agent, but I do not believe that is important if it does not [28] do so when used in connection with the chemicals present in the backgrounds of diazo prints. Dr. Loevenich's deposition goes to the heart of this question. He testifies that thiourea forms an addition compound with a certain chemical present in the background of the finished print and that this compound discolors less easily and is more resistant to oxidation than the substance before reacting with thiourea. He also tells of tests which show that thiourea is not sub-

ject to oxidation. I find that thiourea as used in the light sensitive layer on defendant's paper is not a reducing agent, although it does arrest discoloration. This was the view taken by the German Patent Office in ruling on the opposition by the Van der Grintens to the first Kalle patent. The claims of this patent which call for the presence of a reducing agent in the light sensitive layer on the paper, namely claims Nos. 7, 8, 16, 40 and 41 are not infringed.

Passing to the second question, I do not believe that the patentees' indication that organic reducing agents are preferred excludes inorganic reducing agents from the scope of the patent. It is conceded that sodium thiosulphate, commonly known as hypo, is an inorganic reducing agent. It is contended by defendant that the use of sodium thiosulphate was so well known in the blue printing and allied arts that any skilled workman would naturally use it. True, it was used in the art, but for a different purpose. It was used as a solvent of chemicals insoluble in water in the blue print and sepia processes. If an artisan had used it, it would have been as the result of fumbling, and not with an understanding of its chemical function as a reducing agent. The prior art did not teach its use in this connection.

The filing of the disclaimer as to the sodium thiosulphate claims of the second patent does not affect the issues as to the first patent. Plaintiffs' first patent was a broad one on the [29] use of reducing

agents for the stated purpose. An intermediate patent on the use of the thiosulphate was granted to an Englishman, Murray, and his date of reduction to practice in this country was approximately one month before the corresponding date for plaintiffs' second patent. The Murray patent is upon an improvement upon plaintiffs' first patent which has priority over plaintiffs' second patent. The disclaimer was properly filed as to the second patent, but that does not alter the fact that the use of thiosulphate as a reducing agent infringes plaintiffs' first patent.

A reducing agent tending to arrest discoloration is present in the background of the diazo prints made with the materials sold for that purpose by defendant and is present in defendant's developer. Accordingly claims 1 and 25 of said first patent are infringed. Sodium thiosulphate is neither an aliphatic compound nor an amino compound; therefore claims 3 and 4 of said patent are not infringed. Plaintiffs' findings 22 and 23 are disallowed. Let findings in accordance with these views be prepared in lieu thereof.

I find from the evidence that defendant has infringed all of the claims of the second patent, No. 1,841,653, which are in suit, by offering for sale its sensitive paper and developer and device for applying the developer in a uniformly thin film called the No-Ink Developer, and I accordingly allow plaintiffs' finding No. 24.

Defendant claims that it bought its paper and chemicals from a German company which had a

license from Kalle and Co., which in turn has a license from the Van der Grintens. On analysis, I find that the evidence on this point is unsubstantial and inconclusive. The licenses were not introduced in evidence, and there is no showing that licenses from the Van der Grintens to Kalle and Co. covered the right to carry on [30] plaintiffs' processes in the United States. Dr. Van der Grinten's testimony was merely to the effect that Kalle and Co. had taken licenses, and this testimony was admitted on the issue of patentability. The fact of the license, but not its scope or contents, was testified to. The letter to defendant from the German firm from which its materials come went no further than to state that it had a license from Kalle and Co. Finding 25 of plaintiffs' is allowed in the following form: "That at no time was defendant operating with a license from or with the consent of any of the plaintiffs express or implied."

Since defendant has already proposed findings to the Court embodying its theory of the case, those may be deemed to be the proposed amendments and additions to findings referred to in Rule 42 of this Court.

Let an interlocutory decree be entered enjoining defendant from infringing the claims of said patents herein declared to be infringed and decreeing that plaintiff is entitled to recover damages and such costs of suit as are apportionable to the first patent, No. 1,821,281, and referring the question of the amount of damages to Ernest E. Williams, Esq. of

the Post Office Building, San Francisco, California
as Special Master in Chancery.

Dated this 26th day of November, 1934.

FRANK H. KERRIGAN

United States District Judge

[Endorsed]: Filed Nov. 26, 1934. [31]

[Title of Court and Cause.]

FINALLY APPROVED FINDINGS OF FACT
AND CONCLUSIONS OF LAW PURSU-
ANT TO MEMORANDUM OPINION OF NO-
VEMBER 26, 1934.

This cause duly came on to be heard for trial before this Court at this term for a Permanent Injunction and an accounting for damages for infringement of United States Letters Patent No. 1,821,281 and No. 1,841,653, and testimony having been heard and both sides having appeared in person and by counsel, and the cause having been argued on the merits; and thereupon, upon consideration thereof, the Court hereby makes its Findings of Fact and Conclusions of Law as follows:

FINDINGS OF FACT.

1. Letters Patent of the United States No. 1,821,281 entitled Manufacture of Diazo-Types, were duly and regularly granted on September 1, 1931, by the Commissioner of Patents of the United

States to Karel Van der Grinten and Louis Van der Grinten of Venlo, Netherlands, assignors of the whole to Frans Van der Grinten, Trading as Chemische Fabriek L. Van der Grinten of Venlo, Netherlands.

2. Letters Patent No. 1,821,281 is based upon an application containing the combined subject matter of three applications filed in the Netherlands on December 26, 1926, February 10, 1927, and March 16, 1927, respectively, which application was filed in the United States on June 6, 1927. [32]

3. Letters Patent No. 1,821,281 is entitled to the benefit of Section 4887, Revised Statutes of the Patent Laws of the United States, because the application on which said Patent is based was filed within twelve months from the first filed application in the Netherlands.

4. The subject matter of claims 1, 3, 4, 7, 8, 16, 25, 40, and 41 of Letters Patent No. 1,821,281, the only claims of said Patent relied upon in this suit, are entitled to the filing date of the second application filed in the Netherlands, namely on February 10, 1927, as the earliest effective date of invention.

5. Letters Patent of the United States No. 1,841,653 entitled Process for Developing Positive Diazo Types were duly and regularly granted on January 19, 1932, by the Commissioner of Patents of the United States to Lodewijk Pieter Frans van der Grinten and Karel Jan Josef Van der Grinten of Venlo, Netherlands, assignors of the whole to Frans Van der Grinten, of Venlo, Netherlands.

6. Letters Patent No. 1,841,653 is based upon an application containing the combined subject matter of two applications filed in the Netherlands on August 22, 1927 and May 23, 1928, respectively, which application was filed in the United States on August 11, 1928.

7. Letters Patent No. 1,841,653 is entitled to the benefit of Section 4887, Revised Statutes of the Patent Laws of the United States because the application on which said patent is based was filed within twelve months from the first filed application in the Netherlands.

8. The subject matter of claims 1, 3, 4, 6, 8, 11, 13, 15, 16, and 18 of Letters Patent No. 1,841,653, the only claims of said patent relied upon in this suit, are entitled to the filing date of the first application filed in the Netherlands, namely, on August 22, 1927, as the effective date of invention. [33]

9. The Plaintiff, Charles Bruning Company, Inc., is a corporation organized and existing under the laws of the State of New York and has its principal place of business at No. 102 Reade Street, New York City, New York.

10. The Plaintiff, Charles Bruning Company, Inc., is the sole and exclusive owner by assignment of each and all of the Letters Patent aforesaid together with any and all rights of action and recovery for infringement thereof.

11. The Defendant, Dieterich-Post Company, is a corporation duly organized and existing under the

laws of the State of California and is an inhabitant of and has a regular and established place of business within the Southern Division of the Northern District of California.

12. This suit is for the infringement of each of the Letters Patent aforesaid and arises under the Patent Laws of the United States.

13. Letters Patent No. 1,821,281 covers a new and useful process for making positive diazo type prints which have a white background that resists discoloration to an appreciable extent for extended periods under the usual conditions of preservation in which a reducing agent of the type which, when present in the background of the finished print acts to prevent the discoloration, is added either to the sensitive layer of the copying paper or to the developer, or to both the layer and developer; and also a product including a sensitive layer for making said prints, the light sensitive layer containing a reducing agent.

14. There is no disclosure in the prior art of the making of positive diazo type prints having a white background in the finished print that resists discoloration to an appreciable extent for extended periods under the usual conditions of preservation, nor disclosing a process whereby the discoloration of the white background of the finished diazo type print can be prevented [34] by incorporating, either in the sensitized layer of the paper, or in the developer or in both layer and developer, a reducing agent of

the type that acts to prevent discoloration when present in the background of the finished diazo type print, nor disclosing a product including a sensitive layer for making said prints, the light sensitive layer containing a reducing agent.

15. The invention covered by Letters Patent No. 1,821,281 is a pioneer invention and accordingly such patent No. 1,821,281 is to be liberally interpreted.

16. Letters Patent No. 1,821,281 is good and valid in law, particularly as to claims 1, 3, 4, 7, 8, 16, 25, 40, and 41, thereof here in suit.

17. Patent No. 1,841,653 covers a new and useful process for developing direct positive diazo type prints in which the exposed surface of the print is saturated throughout its entire area with a developing liquid containing a non-volatile alkaline substance by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

18. There is no disclosure in the prior art of a process for developing positive diazo type prints in which the exposed surface of the print is saturated throughout its entire area with a developing liquid containing a non-volatile alkaline substance by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially

corresponding to that required to effect development of said surface.

19. Letters Patent No. 1,841,653 are good and valid in law, particularly as to claims 1, 3, 4, 6, 8, 11, 13, 15, 16, and 18 thereof here in suit.

20. There is no anticipation in the prior art of the [35] inventions covered by the Letters Patent in suit and each of said Patents describe and claim a patentable invention.

21. The Defendant has been duly notified in writing of infringement of the Letters Patent here in suit.

22. Subsequent to the grant of the aforesaid Letters Patent and within six years to the commencement of this suit, the Defendant, Dieterich-Post Company, has sold a sensitized copying paper combined with a developer having a reducing agent; namely, sodium thiosulphate, therein, for the express purpose of making positive diazo type prints which have white backgrounds containing such reducing agent in the finished print capable of resisting discoloration of the background of the print to an appreciable extent for extended periods; and has practiced processes using said paper and developer for making positive diazo type prints having white backgrounds containing such reducing agent in the finished print capable of resisting discoloration of the background of the print to an appreciable extent for extended periods; all within claims 1 and 25 of Letters Patent in suit No. 1,821,281.

23. That in the developer sold and used by the Defendant for use in developing positive diazo type prints on the sensitized copy paper as aforesaid, there was present a reducing agent; namely, sodium thiosulphate, that is capable of resisting to an appreciable extent and for extended periods of time the discoloration of the white background of the finished diazo type print under the usual conditions of preservation.

24. That Defendant, within the time mentioned in the second preceding paragraph, No. 22, has infringed all of the claims in suit of the second patent, No. 1,841,653; namely, claims 1, 3, 4, 6, 8, 11, 13, 15, 16 and 18, by using and offering for sale its sensitive paper and developer and device for applying the developer in a uniformly thin film called the No-Ink Developer. [36]

25. That at no time was Defendant operating with a License from or with the consent of any of the Plaintiffs express or implied.

26. That the sensitized copying paper used and sold by Defendant as Diepo Direcprint Paper No. 500 has a light sensitive layer containing thiourea.

27. That thiourea when present in the white background of the finished positive diazo type print, resists discoloration of such background to an appreciable extent for extended periods under the usual conditions of preservation.

28. That it may be that there are circumstances in which thiourea acts as a reducing agent but thiourea as used in the light sensitive layer on De-

fendant's paper is not a reducing agent in connection with the chemicals present in the background of a positive diazo type print made with Defendant's paper, although thiourea does resist discoloration of the white background of a positive diazo type print to an appreciable extent for extended periods of time when present in said background.

29. That Defendant's developer contained Sodium Thiosulphate; that Sodium Thiosulphate is a reducing agent and resists discoloration of the background of the finished print to an appreciable extent for extended periods, but it is not an aliphatic compound nor an amino compound and is not within claims 3 and 4 of Letters Patent No. 1,821,281.

CONCLUSIONS OF LAW.

1. That Letters Patent here in suit No. 1,821,281 are good and valid in law, particularly as to claims 1, 3, 4, 7, 8, 16, 25, 40, and 41 thereof, which are the claims relied upon in [37] this suit; that claims 1 and 25 thereof have been infringed by the Defendant; that Claims Nos. 3, 4, 7, 8, 16, 40, and 41 have not been infringed by the Defendant.

2. That Letters Patent here in suit No. 1,841,653 are good and valid in law, particularly as to claims 1, 3, 4, 6, 8, 11, 13, 15, 16, and 18 which are the only claims thereof relied upon in the trial of this suit; that each and all of said claims in suit of Letters Patent No. 1,841,653 have been infringed by the Defendant.

3. That claims 7 and 9 of Letters Patent No. 1,841,653 were originally included in this suit by Plaintiff, but during the pendency of this suit said claims 7 and 9 were withdrawn from suit by Plaintiff and disclaimer was duly filed in the United States Patent Office as to said claims 7 and 9; that said disclaimer was filed after this suit was commenced; but was filed promptly and was not unreasonably neglected or delayed.

4. That by reason of said disclaimer of claims 7 and 9 of Letters Patent No. 1,841,653 after commencement of this suit, Plaintiffs are denied an award of costs of suit apportionable to said Letters Patent No. 1,841,653.

5. That the Plaintiffs are entitled to the relief prayed for and to judgment on the issues according to the foregoing Findings of Fact and Conclusions of Law; that an Interlocutory Decree be entered enjoining Defendant from infringing the claims of said Patents herein declared to be infringed and decreeing that Plaintiffs are entitled to recover damages for said infringement and for such costs of suit as are apportionable to Letters Patent No. 1,821,281; that the question of the amount of said damages be referred [38] to Ernest E. Williams, Esq., of the Post Office Building, San Francisco, California, as special Master in Chancery.

FRANK H. KERRIGAN,

United States District Judge.

Dated: This 5th day of January, 1935.

Approved as to form as provided in Rule 42.

WRAY N. HOFFMAN,

IVAN KONIGSBERG,

WM. S. GRAHAM,

Attorneys for Plaintiffs.

ASA G. KAZEBEER,

ARLINGTON C. WHITE,

Attorneys for Defendant.

IT IS ORDERED that an exception is allowed to each of the parties to the foregoing Findings and Conclusions, and ten days are allowed for filing formal exceptions.

FRANK H. KERRIGAN,

U. S. District Judge.

[Endorsed]: Filed Jan. 5, 1935. [39]

[Title of Court and Cause.]

PLAINTIFFS' EXCEPTIONS TO FINALLY
APPROVED FINDINGS OF FACT AND
CONCLUSIONS OF LAW.

This cause in Equity having been tried to the Court and the parties having heretofore submitted proposed Findings of Fact and Conclusions of Law, and the Court having considered and settled same; and Finally Approved Findings of Fact and Conclusions of Law having been engrossed and presented for approval to the Court pursuant to Rule 42 of this Court and:

1. Plaintiffs having requested of the Court a Finding of Fact that processes used and products used and sold by Defendants were within claims Nos. 1, 3, 4, 7, 8, 16, 25, 40, and 41 of Letters Patent No. 1,821,281 in suit, and the Court having approved a Finding of Fact (No. 22) that the processes used and products used and sold by Defendant were within claims 1 and 25 only of said Letters Patent, and having refused to find that Defendant's process and products were within claims 3, 4, 7, 8, 16, 40, and 41 of said Letters Patent, Plaintiffs except to that portion of Finding of Fact No. 22 in which said Finding of Fact fails to find that the processes used and products used and sold by Defendant are within claims Nos. 3, 4, 7, 8, 16, 40 and 41 of Letters Patent in suit No. 1,821,281.

2. Plaintiffs having requested of the Court a Finding of Fact that there was present in the sensitized paper and in the [40] developer used and sold by Defendant a reducing agent of the type which acts to resist discoloration of the white background of the finished diazo type print under the usual conditions of preservation, and the Court having approved a Finding of Fact (No. 28) which states in part that—"thiourea as used in the light sensitive layer on Defendant's paper is not a reducing agent in connection with the chemicals present in the background of a positive diazo type print made with Defendant's paper"—, Plaintiffs except to that portion of Finding of Fact No. 28 which states "thiourea as used in the light sensitive layer on Defend-

ant's paper is not a reducing agent in connection with the chemicals present in the background of a positive diazo type print made with Defendant's paper."

3. Plaintiffs having requested of the Court a Conclusion of Law that the processes used and products used and sold by Defendant were an infringement of claims 1, 3, 4, 7, 8, 16, 25, 40 and 41 of Letters Patent No. 1,821,281, and the Court having approved a Conclusion of Law (No. 1) that claims 1 and 25 only of said Letters Patent were infringed by Defendant and that claims Nos. 3, 4, 7, 8, 16, 40 and 41 have not been infringed by Defendant, Plaintiffs except to that portion of Conclusion of Law No. 1 which states in respect of Letters Patent No. 1,821,281,—“that claims Nos. 3, 4, 7, 8, 16, 40 and 41 have not been infringed by the Defendant”—:

And the Court having considered said exceptions and objections of Plaintiffs and having overruled same and having allowed Plaintiffs an exception to said rulings and each of them:

NOW, THEREFORE, Plaintiffs tender this, their exceptions to the action of the Court in the various particulars herein set out which are signed by the Court and made a part of the Record in this cause.

FRANK H. KERRIGAN,
United States District Judge.

Dated: San Francisco, California, January 14th,
1935. [41]

ACKNOWLEDGMENT OF RECEIPT OF
PLAINTIFFS' EXCEPTIONS TO FINALLY
APPROVED FINDINGS OF FACT AND
CONCLUSIONS OF LAW.

Receipt of a copy of the foregoing PLAIN-
TIFFS' EXCEPTIONS TO FINALLY AP-
PROVED FINDINGS OF FACT AND CONCLU-
SIONS OF LAW admitted this 14th day of Jan-
uary, 1935.

ASA G. KAZEBEER,
ARLINGTON C. WHITE,
Attorney for Defendant.

[Endorsed]: Filed Jan. 14, 1935. [42]

[Title of Court and Cause.]

DEFENDANT'S EXCEPTIONS TO FINALLY
APPROVED FINDINGS OF FACT AND
CONCLUSIONS OF LAW.

The parties having heretofore submitted pro-
posed Findings of Fact and Conclusions of Law,
and the court having considered and settled and the
same; and Finally Approved Findings of Fact and
Conclusions of Law having been engrossed and pre-
sented for approval to the court pursuant to Rule
42 of this court, and defendant having thereupon ex-
cepted to the following, to-wit:

FINDINGS OF FACT.

1. Defendant excepts to Finding 15 in its entirety.

2. Defendant excepts to Finding 16 in its entirety.

3. Defendant excepts to that portion of Finding 17 which states that—Patent No. 1,841,653 covers a new and useful process—.

4. Defendant excepts to Finding 18 in its entirety.

5. Defendant excepts to Finding 19 in its entirety.

6. Defendant excepts to Finding 20 in its entirety.

7. Defendant excepts to that portion of Finding 22 which states—all within claims 1 and 25 of Letters Patent in suit No. 1,821,281—.

8. Defendant excepts to Finding 24 in its entirety. [43]

9. Defendant excepts to Finding 25 in its entirety.

CONCLUSIONS OF LAW.

1. Defendant excepts to all of Conclusion of Law No. 1 except that portion which states—that claims Nos. 3, 4, 7, 8, 16, 40 and 41 have not been infringed by the defendant—.

2. Defendant excepts to Conclusion of Law No. 2 in its entirety.

3. Defendant excepts to that portion of Conclusion of Law No. 3 which states—but was filed

promptly and was not unreasonably neglected or delayed—.

4. Defendant excepts to Conclusion of Law No. 5 in its entirety;

and the court having considered said Exceptions and objections of defendant and having overruled same, and the defendant having thereupon saved an exception to said rulings, and each of them.

IT IS ORDERED that said Exceptions be and the same are hereby allowed.

FRANK H. KERRIGAN,
United States District Judge.

Dated: San Francisco, January 14th, 1935.

Receipt of a copy of the foregoing Defendant's Exceptions to Finally Approved Findings of Fact and Conclusions of Law, is hereby admitted this 14th day of January, 1935.

IVAN E. A. KONIGSBERG,
WRAY N. HOFFMAN,
WM. S. GRAHAM,
Attorneys for Plaintiffs.

[Endorsed]: Filed Jan. 14, 1935. [44]

[Title of Court and Cause.]

STIPULATION EXTENDING TIME FOR
ENTRY OF DECREE.

Because of the decease of the Honorable FRANK H. KERRIGAN, lately United States District

Judge before whom the above-entitled cause was tried and determined, and because there is now pending before the Court a Motion by Defendant to Re-Open the cause for the hearing of further evidence, IT IS HEREBY STIPULATED that the entry of Decree in this cause may be continued beyond the present term of the Court and that entry of said Decree within the March, 1935, term of the Court shall be good, timely, and sufficient.

WRAY N. HOFFMAN,
WM. S. GRAHAM,

Attorneys for Plaintiffs.

ASA G. KAZEBEER,
ARLINGTON C. WHITE,

Attorneys for Defendant.

Dated: San Francisco, California, March 1, 1935.

Approved and so Ordered:

A. F. ST. SURE,
U. S. District Judge.

[Endorsed]: Filed Mar. 4, 1935. [45]

[Title of Court and Cause.]

STIPULATION RELATIVE TO BILL OF
PARTICULARS.

For purposes of condensing the Transcript of Record on Appeal, it is Stipulated that Defendant filed a Motion for Bill of Particulars on or about May 1, 1933, requesting to be advised which of the

claims of the Letters Patent in suit would be relied upon by Plaintiffs at the trial of the suit; that in response thereto Plaintiffs filed a Bill of Particulars on or about June 13, 1933, stating that the following claims would be relied on, to-wit:

Letters Patent	Claims
1,821,281	(1, 3, 4, 6, 7, 8, 16, 25, 40, (41, 43 and 44.
1,841,653	(1, 3, 4, 6, 7, 8, 9, 10, 11, (13, 15, 16, 18, and 19.

That prior to trial on or about August 13, 1934, Plaintiffs, pursuant to leave of Court, struck out from the above listed claims, the following:

From	
Letters Patent	Claims
1,821,281	6, 43, and 44.
1,841,653	7, 9, 10, and 19.

That this stipulation may be filed, upon approval by the Court, at any time prior to expiration of time for Appeal from [46] Interlocutory Decree, if appeal be taken by either party.

WRAY N. HOFFMAN,

WM. S. GRAHAM,

Attorneys for Plaintiffs.

ASA G. KAZEBEER,

ARLINGTON C. WHITE,

Attorneys for Defendant.

Approved and so ordered, this 8th day of April, 1935.

A. F. ST. SURE,
United States District Judge.

[Endorsed]: Filed Apr. 8, 1935. [47]

In the Southern Division of the United States District Court for the Northern District of California.

In Equity No. 3493-K.

FRANS VAN DER GRINTEN and CHARLES
BRUNING COMPANY, INC.,

Plaintiffs,

vs.

DIETERICH-POST COMPANY,

Defendant.

INTERLOCUTORY DECREE.

This cause came on to be heard at this term and was argued by counsel; and thereupon, upon consideration thereof it was ORDERED, ADJUDGED and DECREED as follows, viz:

I.

That Letters Patent of the United States No. 1,821,281 entitled Manufacture of Diazo-Types, were duly and regularly granted on September 1, 1931, by the Commissioner of Patents of the United States to Karel Van der Grinten and Louis Van der Grin-

ten of Venlo, Netherlands, assignors of the whole to Frans Van der Grinten, Trading as Chemische Fabriek L. Van der Grinten of Venlo, Netherlands.

II.

That Letters Patent No. 1,821,281 is based upon an application containing the combined subject matter of three applications filed in the Netherlands on December 26, 1926, February 10, 1927, and March 16, 1927, respectively, which application was filed in the United States on June 6, 1927.

III.

That Letters Patent No. 1,821,281 is entitled to the benefit of Section 4887, Revised Statutes of the Patent Laws of the United States, because the application on which said Patent is based was filed within twelve months from the first filed application in the Netherlands.

IV.

That the subject matter of claims 1, 3, 4, 7, 8, 16, 25, 40, and 41 of Letters Patent No. 1,821,281, the only claims of said Patent relied upon in this suit, are entitled to the filing date of the second application filed in the Netherlands, namely, on February 10, 1927, as the earliest effective date of invention.

V.

That the invention covered by Letters Patent No. 1,821,281 is a pioneer invention and accordingly

such patent No. 1,821,281 is to be liberally interpreted.

VI.

That Letters Patent of the United States No. 1,841,653 entitled Process for Developing Positive Diazo Types were duly and regularly granted on January 19, 1932, by the Commissioner of Patents of the United States to Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten of Venlo, Netherlands, assignors of the whole to Frans Van der Grinten, of Venlo, Netherlands.

VII.

That Letters Patent No. 1,841,653 is based upon an application containing the combined subject matter of two applications filed in the Netherlands on August 22, 1927 and May 23, 1928, respectively, which application was filed in the United States on August 11, 1928.

VIII.

That Letters Patent No. 1,841,653 is entitled to the benefit of Section 4887, Revised Statutes of the Patent Laws of the United States because the application on which said patent is based was filed within twelve months from the first filed application in the Netherlands. [49]

IX.

That the subject matter of claims 1, 3, 4, 6, 8, 11, 13, 15, 16, and 18 of Letters Patent No. 1,841,653, the only claims of said patent relied upon in this

suit, are entitled to the filing date of the first application filed in the Netherlands, namely, on August 22, 1927, as the effective date of invention.

X.

That the Plaintiff, Charles Bruning Company, Inc., is a corporation organized and existing under the laws of the State of New York having its principal place of business in the City of New York, in said State; that the Plaintiff, FRANS VAN DER GRINTEN is a resident and inhabitant of the country of Holland.

XI.

That the Plaintiff, Charles Bruning Company, Inc., is the sole and exclusive owner, by assignment during the pendency of this suit, of each and all of the Letters Patent aforesaid, together with any and all rights of action and recovery of damages and/or profits for infringement thereof.

XII.

That the Defendant, Dieterich-Post Company, is a corporation duly organized and existing under the laws of the State of California and is an inhabitant of and has a regular established place of business within the Southern Division of the Northern Judicial District of California.

XIII.

That said Letters Patent No. 1,821,281 are good and valid in law and particularly as to claims 1, 3,

4, 7, 8, 16, 25, 40, and 41 thereof which are the only claims here in suit.

XIV.

That Letters Patent No. 1,841,653 are good and valid in law, particularly as to claims 1, 3, 4, 6, 8, 11, 13, 15, 16, and 18 thereof which are the only claims here in suit. [50]

XV.

That the Defendant, Dieterich-Post Company, has infringed upon the aforesaid Letters Patent No. 1,821,281 and particularly claims 1 and 25 thereof, and upon the rights of Plaintiffs therein.

XVI.

That the Defendant, Dieterich-Post Company, has not infringed claims 3, 4, 7, 8, 16, 40, and 41 of said Letters Patent No. 1,821,281.

XVII.

That the Defendant, Dieterich-Post Company, has infringed the aforesaid Letters Patent No. 1,841,653 and particularly claims 1, 3, 4, 6, 8, 11, 13, 15, 16 and 18 thereof, and upon the rights of Plaintiffs therein.

XVIII.

That the Plaintiff, Charles Bruning Company, Inc., do recover from the Defendant, Dieterich-Post Company, the profits, gains, and advantages which the said Defendant has derived, received or made by reason of said infringement of said claims 1 and 25 of Letters Patent No. 1,821,281 and claims 1, 3, 4,

6, 8, 11, 13, 15, 16, and 18 of said Letters Patent No. 1,841,653, and that the Plaintiff do recover of said Defendant any and all damages which the Plaintiff has sustained or shall sustain by reason of said infringement by the Defendant; and that the question of the amount of the said profits and/or damages be referred to Ernest E. Williams, Esq., as a Master in Chancery of this Court, who is hereby appointed *pro hac vice*, to take and state the amount of said gains, profits, and advantages and to assess such damages and to report thereon to this Court; and the Defendant, Dieterich-Post Company, its directors, officers, attorneys, clerks, servants, and workmen are hereby directed and required to attend before said Master from time to time as required, and to produce before him such books, papers, vouchers, and [51] documents, and to submit to such oral examination as the Master may require.

XIX.

That a Permanent and Perpetual Injunction issue out of and under the Seal of this Court, directed to said Defendant, DIETERICH-POST COMPANY, its officers, clerks, attorneys, directors, associates, agents, servants, workmen and all persons in active concert or participation therewith, enjoining and restraining them and each of them during the unexpired term of said Letters Patent No. 1,821,281 and 1,841,653, unless by the license and consent of Plaintiffs, from practicing or causing to be practiced, in any manner, directly, indirectly, or by con-

tribution to the acts of others, any process or method, including, embodying, or employing said inventions and improvements described in said Letters Patent No. 1,821,281 and claimed in claims 1 and 25 thereof, and/or the inventions and improvements described in said Letters Patent No. 1,841,653 and claimed in claims 1, 3, 4, 6, 8, 11, 13, 15, 16 and 18 thereof, which claims of said respective Letters Patent are as follows:

Claims of Letters Patent No. 1,821,281.

1. The process of rendering the background of the diazo type prints substantially stable against discoloration which comprises including therein a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said prints.

25. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, exposing such layer, and contacting the exposed layer with a developer containing an azo dyestuff component and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said prints. [52]

Claims of Letters Patent No. 1,841,653.

1. The process for developing direct positive diazo prints which consists in impressing upon the surface to be developed an alkaline liquid

containing an azo-dyestuff component and a reducing agent non-decomposable by alkali, in the form of a uniformly thin film.

3. The process for developing direct positive diazo prints which consists in impressing an alkaline liquid containing an azo-dyestuff component in the form of a uniformly thin film upon an exposed surface having a diazo compound therein, said film containing the azo-dyestuff component in an amount not substantially in excess of that required to couple with the diazo compound.

4. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

6. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and a reducing agent non-decomposable by alkali by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being

substantially corresponding to that required to effect development of said surface.

8. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance, an azo-dyestuff component, and a reducing agent non-decomposable by alkali by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface. [53]

11. The process for developing direct positive diazo prints containing a diazo compound of the type which cannot be used together with azo-dyestuff components in the light sensitive layer which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and an azo-dyestuff component by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

13. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface

of said prints with a developing liquid containing a non-volatile alkaline substance by momentarily wetting the exposed surface with an excess of said liquid and removing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

15. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and a reducing agent non-decomposable by alkali by momentarily wetting the exposed surface with an excess of said developing liquid and removing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

16. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and an azodyestuff component by momentarily wetting the exposed surface with an excess of said develop-

ing liquid and removing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

18. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance, and azodyestuff component and a reducing agent [54] non-decomposable by alkali by momentarily wetting the exposed surface with an excess of said developing liquid and removing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

XX.

That the Plaintiffs do recover of the Defendant its costs and disbursements of this suit which are apportionable to the Letters Patent in suit No. 1,821,281, to be taxed by the Clerk of this Court and the amount thereof to be inserted in this Decree in the sum of \$.....; and that the Plaintiffs have judgment against the Defendant for the amount so taxed and inserted in this Decree.

XXI.

That the question of increase of damages and all further questions be reserved until the Master in Chancery shall make his report to this Court.

A. F. ST. SURE,
United States District Judge.

Dated: This 8th day of April, 1935.

STIPULATION AS TO APPROVAL BY JUDGE
AND AS TO FORM.

IT IS STIPULATED that, because of the death of the trial Judge, Hon. Frank H. Kerrigan, the foregoing INTERLOCUTORY DECREE may be approved by any other District Judge sitting in this Court, without waiver by the parties of any other rights.

Approved as to form, as provided in Rule 22.

ASA G. KAZEBEER,
ARLINGTON C. WHITE,
Attorneys for Defendant.

[Endorsed]: Filed and entered Apr. 8, 1935. [55]

[Title of Court and Cause.]

STATEMENT OF EVIDENCE

The above-entitled cause came on for hearing on the 31st day of October, 1934, before Hon. FRANK H. KERRIGAN, United States District Judge, and after opening statements of Counsel, the opening testimony was taken and Exhibits introduced.

During the opening statements it was stated to the Court by Counsel for Plaintiffs that Plaintiffs would rely upon the trial of the cause on claims 1, 3, 4, 7, 8, 16, 25, 40, and 41 of United States Letters Patent No. 1,821,281, and on claims 1, 3, 4, 6, 8, 11, 13, 15, 16, and 18 of United States Letters Patent No. 1,841,653.

The Plaintiffs offered in evidence the following Exhibits, which were admitted:

PLAINTIFFS' EXHIBIT No. 1 *

United States Letters Patent No. 1,821,281, granted September 1, 1931, to Karel Van der Grinten and Louis Van der Grinten for Manufacture of Diazo-Types, on application filed in the United States on June 6, 1927, based on an application in the Netherlands, filed December 11, 1926.

PLAINTIFFS' EXHIBIT No. 2 *

United States Letters Patent No. 1,841,653, granted January 19, 1932, to Lodewijk Pieter Frans Van der Grinten and Karel Jan Josef Van der Grinten, for Process for Developing Positive Diazo Prints on application filed in the United States on August 11, 1928, based on application filed in the Netherlands on August 22, 1927. [56]

PLAINTIFFS' EXHIBIT No. 3

Certified copy of file wrapper and contents of United States Letters Patent No. 1,821,281.

*[Printer's Note]: Copies of Patents are set forth opposite page 464 of the printed transcript.

PLAINTIFFS' EXHIBIT No. 4.

Certified copy of file wrapper and contents of United States Letters Patent No. 1,841,653.

PLAINTIFFS' EXHIBIT No. 5.

Stipulation of Receipt by Defendant of written Notice of Infringement, and also as to the sale by Defendant of products.

PLAINTIFFS' EXHIBIT No. 6.

Interrogatories propounded by Plaintiffs and Defendant's Answers thereto. (Not transmitted to the Appellate Court since material parts thereof were agreed upon by Counsel and read into the Record at the request of trial Judge.

Title to the Patents in suit was stipulated to be in Plaintiffs.

During the opening statement on behalf of Defendant, the following Exhibits were offered in evidence and admitted:

DEFENDANT'S EXHIBIT B

Certified copy of file wrapper and contents of United States Letters Patent No. 1,765,059 granted April 1, 1930, to Humphrey Desmond Murray.

DEFENDANT'S EXHIBIT C

Copy of United States Letters Patent No. 1,444,469 granted February 6, 1923 to Gustave Kogel assignor to Kalle & Company.

DEFENDANT'S EXHIBIT D

German Letters Patent No. 427,570 issued July 7, 1925 to E. Gronau, together with translation thereof.

Deposition of Josef Loevenich taken in Germany on behalf of Defendant was admitted in evidence and considered as read into the Record.

The usual Stipulation was made to use of printed copies of Patents. [57]

STATEMENT OF EVIDENCE. [58]

TESTIMONY OF LODEWIJK PIETER FRANS
VAN DER GRINTEN FOR PLAINTIFFS

LODEWIJK PIETER FRANS VAN DER GRINTEN, called as a witness on behalf of plaintiffs, being duly sworn testified as follows:

Direct Examination

My name is LODEWIJK PIETER FRANS VAN DER GRINTEN; 40 years old; residence, Venlo, Holland. I am both a subject of the Queen of The Netherlands and a resident of The Netherlands. I attended a technical university in Munich, Germany, graduating therefrom in 1914. While attending this university I specialized in organic chemistry. I obtained from such university the degree of Doctor of Chemistry and Doctor Engineer in Chemistry, my thesis being on an organic compound.

(Testimony of Frans Van der Grinten.)

My occupation is that of a chemical engineer and director of the firm N. V. Chemische Fabriek and Frans Van der Grinten in Venlo. During the war I was engaged as a chemist in The Netherlands Government Munitions Works, and after the war, in two companies owned by my father, one of which was manufacturing azodyestuffs, and the other of which was manufacturing light sensitive paper like blue print paper. In 1926 and 1927, I together with my brother, Karel Jan Josef Van der Grinten made the inventions of the two patents in suit. Since the making of these inventions I have been exclusively engaged in the positive diazo type art. I am one of the joint inventors of the two patents in suit.

“Q. You are familiar with the Van der Grinten patent No. 1,821,281?

“A. Yes, I am.

“Q. Will you explain the invention to which this patent relates? [59]

“A. The invention to which this patent relates belongs to the technical reproduction processes. In technical reproduction processes, like any other photostatic reproduction processes, the reproduction of prints is obtained by the action of light. We start from an original, mostly a tracing, which is made up in black and untransparent lines on a transparent material. This tracing and the sensitive material are brought together in close contact in printing forms or in special printing devices, and

(Testimony of Frans Van der Grinten.)

we make the light rays pass through the original tracing to this light-sensitive surface. Now, these light-sensitive surfaces in reproduction processes have the property of changing chemically under the influence of light; after the treatment of light consequently the parts which have constituted a transparent part of the tracing have been chemically changed; they have become different from those parts which were dark from the action of light, which latter parts remain in their original condition and upon this difference in their chemical composition between the exposed and non-exposed all of these reproduction processes are based. After the treatment of light, which we call the exposure, we obtain a so-called exposed print. The exposed print without any further treatment would not of course be stable against the further action of light, and in practice when we wish to have some use out of the print, we, of course, must be able to look at this print, which, of course, involves further light coming to such a print. We, for instance, might want to look at such a print near a window, and the light that would come to this print, of course, in these parts of the print which were protected upon exposure, which were in contact with the dark part originally, would be the same as the exposed parts have been upon exposure. The result would be that the whole print would have the same appearance as the [60] exposed part, there would be no more difference between the exposed and non-exposed

(Testimony of Frans Van der Grinten.)

parts. Therefore, of course, after the print has been made, a special operation, or one or more operations, has to be carried out in order to make the print stable against further action of the light. Often such operations involve at the same time the making visible of the print like, for instance, in the case with this diazo-type process. To give one example of technical reproduction process that has been used for many years and is still in use, I would like to refer to the so-called blueprint. A light-sensitive blueprint paper contains a layer which upon exposure to light forms a blue color. The after treatment necessary for making the blueprint stable we call the fixing operation, which is simply by washing this print out. By washing it out the substance will not be changed by the action of light upon the exposure. Consequently, these parts of the print which were protected by the dark part originally are thus washed out and deprived of their light sensitiveness. We would consequently have a printing and fixing operation only, the print only becoming visible upon exposure itself, because the blue color was formed under the action of light, itself.

Now, I wish to go to the diazo type processes in which the invention of the patent in suit is carried out. I would like to refer to a chart which has been prepared and which gives an idea about the diazo-type process as such, as it was in existence when our inventions were made. The things shown on

(Testimony of Frans Van der Grinten.)

this chart consequently give an idea at the same time of the prior art.

Under Roman numeral I, on the left-hand part of this chart, we see a cross section of a sheet of paper which we call the base. Instead of paper we of course may use any other base suitable for the purpose, for instance, a piece of linen, [61] or a film of any kind or substance. On top of this base we find a light sensitive coating or layer containing diazo compound, the diazo compound being the most important substance of the whole process. Now, this diazo compound layer is under Roman numeral II in the left-half part of the chart, shown contacting with the tracing, the tracing being transparent in certain portions and nontransparent in certain portions. The exposure is done by making light pass through original tracing onto the sensitive coating of the diazo compound. Now, the diazo compounds are a large class, I might say, of chemical substances which all have two characteristic properties. The first is a diazo compound can be decomposed by light. By decomposed by light in this case we must understand a transforming of the diazo compound into another substance, a substance which is no longer a diazo compound. So I would like to make you understand not that the diazo compound disappears entirely by the action of light, that not such a thing occurs as an evaporation or anything of that kind, but just merely chemical changes take place by which the diazo compound is

(Testimony of Frans Van der Grinten.)

transformed to another chemical substance which, of course, will remain in the light-sensitive layer. The second property of the diazo compound which is interesting in connection with this invention is that it is capable of forming a so-called azodyestuff when it is contacted and made to react with certain substances which we call an azo coupling component. When a diazo compound is mixed with an azo coupling component these two substances are capable of uniting into one new substance. If we take one molecule, that is, a small part of diazo compound and we take another molecule of azodyestuff component and bring them together in a mixture under favorable circumstances the two molecules unite together to form a new compound. The reacting is in chemistry called a coupling, [62] that is to say, the two molecules are coupled together and a quite new substance appears which is called azodyestuff, and which is a substance which has no more the properties of the diazo compound. Azodyestuff is a highly-colored, or I might better say strongly colored substance, while the azo component only has a weak color. Also, the azodyestuff which is formed is no more light-sensitive. It is quite a different substance from the substance from which it has been made by this coupling reaction. Upon exposure under Roman numeral II we have made use of a certain property of the azo compound, namely, the decomposition by the action of light. Under Roman numeral III we are going to the

(Testimony of Frans Van der Grinten.)

second property of the azo compound. I made a mistake, not under Roman numeral III, but under Roman numeral IV. I first want to show you how after removal of the original tracing the layer in which light-sensitive azo compound was present is built up after exposure. This shows under Roman numeral III. We again see here the base of the paper, and on the base we see that these parts which were protected by the dark part of the tracing still contain the diazo compound, which is in this cross-section indicated by a hatching of these parts, and the parts which were exposed no more contain diazo compound; that is now contain a new substance which is formed by the reaction of light. We call these latter parts, the parts which contain the bleached out diazo compound, the decomposed diazo compound. The other part contains the diazo compound undecomposed. These parts form a picture in weak yellow lines on a white background of the exposed part. We now make use of the azo compound coupling with a diazo compound so as to form an azo-dyestuff in these parts. In the old way it was done by submerging such a print in a bath containing a solution in water of an azo coupling component and alkali. I think this is a convenient time to explain why we use this alkali here. As I said before, the coupling as between the diazo compound [63] and the azo coupling component only takes place under favorable circumstances. The circumstances favorable for this coupling reaction are

(Testimony of Frans Van der Grinten.)

that the medium in which these two substances must be brought together must be neutral or, if possible, alkaline. On the contrary, I can say that an acid medium, acid being the opposite of alkali, is perfectly unfavorable for the formation of an azodye-stuff. After the development, which consists of the introduction of this azodyestuff component and the alkali into the layer we obtain the diazo print which we also call a finished picture or finished print, and which now, by the action of the azodye-stuff component and the alkali upon these parts of the print which contains diazo compound and azodyestuff is formed in these parts, and we now have practically the finished picture of a mixture of decomposed products of diazo compound and azodye-stuff component on the exposed parts, and the azodyestuff in the unexposed parts. I might mention here that the azo coupling component, which, as I said, is capable of reacting, is the product which has been formed from the diazo compound upon exposure, consequently with the decomposed product of the diazo compound; a short washing of this print is done and a drying operation follows. In the prior art there was a firm by the name of Kalle who invented a new process which was more practical than these processes had ever been carried out in practice before. In this newly-invented process, the light-sensitive coating, consequently the layer which in the left-hand part of the chart only contains the diazo compound, now contains not only the diazo

(Testimony of Frans Van der Grinten.)

compound but also the azo coupling component, consequently also the substance with which on development the azo component can form the azodyestuff. This layer also contains an acid for the purpose of preventing the diazo compound coupling with the azodyestuff component, because otherwise, that is to say, this coupling as it has taken place in the sensitive layer of course can no [64] more make any print. The original diazo compound would not be present, would have been transformed into an azo dyestuff which it no more light-sensitive. A very important feature, consequently, of this is the presence of an acid in the sensitive layer. On the other hand, the sensitive layer has the advantage that it carries with it the second substance, the azodyestuff component, which in the old processes had to be added on development. These processes consequently contain practically everything which is needed later on for development. It takes place in the same way as in the old processes. I might mention this, that the presence of this azo coupling component, provided, of course, that a sufficient amount of acid is present to prevent any other action between this component and the diazo compound, in no way interferes with the light reaction, with the photo chemical reaction of the diazo compound, itself. The diazo compound is likewise, as indicated under Roman numerals II and III in the left-hand part of the chart, decomposed in the exposed part and remains unaltered in the dark part.

(Testimony of Frans Van der Grinten.)

Under Roman numeral III we obtain an undeveloped diazo-type print which only differs from the developed diazo print obtained in the old processes by the azo coupling component being present in the whole layer somewhere, that is to say, in the unexposed part as well as in the exposed part. Now, in this case, the developing operation is much more simple than in the old processes, because we have no more to add this azodyestuff component, because it is already present in there. The only thing in this process which we have now to add is in the after treatment of the exposed print, we have to make the conditions favorable for the formation of the azodyestuff, which operation consists of taking away the acid which prevents the formation of the azodyestuff, which can be done by neutralizing the acid with an alkali, and to make the layer alkaline so [65] that then the coupling reaction can now take place in those parts which were protected from exposure. There is a particular advantage in this way of carrying out the diazo-type process because we can now use here a so-called volatile alkali which has the form of gas, and consequently can be applied to such a print in a dry way without any bath or liquid being involved in the process. We introduce such a print in a room, in a tank, or in any kind of a room in which ammonia vapors are present. The ammonia vapors penetrate into the layers of the print and there do their work, neutralizing the acid, creating an alkali medium, and thus

(Testimony of Frans Van der Grinten.)

cause the formation of the azodyestuff in the unexposed parts, in a perfectly dry way, without any liquid to interfere with developing that print. We, of course, can do the same operation also with liquid, also can use a non-volatile alkali, as, for instance, sodium hydroxide. Of course, in this case the print has to be dried because it has been treated with a bath containing water.

I will come now to the principles of the invention of the first patent in suit. I wish to refer especially to this last-named form of carrying out the process, namely, the form by which the development is done with the volatile alkali. It doubtless will be clear, after what I have said, that in this case all of these substances which have been applied to the base paper, or have been changed into other substances like the diazo compound, and, for instance, the acid which has been changed into a salt from the acid remains in the picture, remains in this white background of the print. Everything had been added to the print, first the light-sensitive coating has been added to the paper, the diazo compound in the white background has been changed into another substance, because it has been changed by the action of the light and has been changed into another product, namely, the decomposed product of the diazo com- [66] pound. The azo component was already added to the light-sensitive layer and nothing has been taken out, consequently in the finished print also the azodyestuff component is still

(Testimony of Frans Van der Grinten.)

present, especially in the white background, where this azodyestuff component was not used up for the formation of the azodyestuff. These chemical substances are all present in this white background of the finished print. The substances are white substances, uncolored substances. The azodyestuff component is an uncolored substance. So also is the decomposition product of the diazo compound. Consequently our print, immediately after it has been made, has a perfect uncolored background. It is what we call white as long as it is, of course, on a white paper. However, under the influence of the atmosphere, and partly under the influence of light, these two substances consequently—the decomposition product of the diazo compound and the azodyestuff component—have a tendency to turn into brown-yellow substances. Thus when such a print is stored for a certain time, the atmosphere being always and everywhere present, these substances cause what might be called the discoloration.

In the old processes the discoloration was not very strong, but still strong, because in the old processes we had a washing-out operation later by which we eliminated partly these substances out of the white background. However, these substances have a very strong adhesive power to the fiber of the base paper, and practically cannot be washed out except perhaps to the extent of 50 per cent. Consequently the old processes had to do with a certain discoloration. A much stronger discolora-

(Testimony of Frans Van der Grinten.)

tion we then got when we proceeded to those processes in which nothing was taken out at all, in which no washing operation was applied. Consequently in these processes we have a much stronger discoloration. I said that this discoloration was due to the action of the atmosphere upon the substances present in the background. Well, the [67] substance in the atmosphere which is responsible for this change is the oxygen of the air. It is well known that the air consists of a mixture of oxygen and nitrogen, the oxygen, however, always being in all reactions in which atmosphere is involved the active product of the atmosphere. When we found the diazo-type art in this condition and saw how these prints discolored we, of course, first investigated whether it really was true that this discoloration was due to an action of the atmosphere and consequently to an action of the oxygen of the air. We made a very simple experiment by making one diazo-type print and cutting it into two pieces, and storing one piece under normal conditions, that is to say, in contact with the atmosphere; the other part we stored in a room out of which we had pumped the air, that is to say, we stored it in a vacuum. After a few weeks we found that the first-named part of the print had been discolored, whilst the second part, which had been kept out of contact with the atmosphere, was not discolored. That was sufficient proof to us to know that we had to have an inter-action between the oxygen of the air and

(Testimony of Frans Van der Grinten.)

these two substances present in the background of the finished print. I might say that in chemistry we call such inter-action between oxygen and another substance an oxidation.

Now, I will come to the invention of the first patent in suit and state that this invention is based upon the discovery that this discoloration, and consequently this oxidation reaction can be counter-acted by introducing into the white background of the finished print a reducing agent. The invention as laid down in the first patent in suit is described in this patent on page 2, lines 55 to 61. In very short words the patent says:

“The invention is based on the observation that the discoloration of the background in all kinds of diazo-type processes can be prevented even for extended periods if a reducing agent is added to the sensitive layer, or during or after development of [68] the picture.”

In shorter words still, that means that the invention is based upon the discovery that when a reducing agent is present in the finished print the discoloration is thereby arrested. In the sense of this invention it is not of importance in which way these reducing agents are introduced into the finished print. The only thing which is pertinent is that this reducing agent is there present in order to prevent or to arrest the discoloration.

A second chart has been prepared which shows that we can introduce the reducing agent into the

(Testimony of Frans Van der Grinten.)

finished print in many different ways. The sensitive layer containing the diazo compound only is exposed and developed; upon development there is applied an azo coupling component and an alkali, and at the same time upon development a reducing agent. When such a print is dried it contains this one reducing agent which has been introduced into the paper upon the development. We can of course also dry this print and apply after development a reducing agent again. Such a print contains the reducing agent which has been applied upon development and which has been applied after. We also can develop with a developer without reducing agent, dry and apply a reducing agent later. Such a print only contains the reducing agent which has been applied after development. We can also make a light-sensitive coating containing a diazo compound and already a reducing agent and expose such layer. The developing can be done with a developer containing no reducing agent. The print thus obtained only contains the reducing agent which has been added to the print in the sensitive layer. After development we can apply a reducing agent and such a print contains a reducing agent, as was present in the light-sensitive layer, and a reducing agent that was applied later. We can develop with a developer containing a reducing agent and dry such a print; then [69] we have a print containing two reducing agents, one applied with the sensitive layer and the other with the developer. We also

(Testimony of Frans Van der Grinten.)

can here again add a reducing agent for the third time, in which case we have three reducing agents present in the finished print. We can make a sensitive layer containing a diazo compound and an azodyestuff component, that is to say, a layer like in the prior art chart on the left-hand side, No. I, and add a reducing agent to such a layer. As we have seen, such a layer can be developed after exposure with a volatile alkali, in which case we practically have no more chance to introduce any more reducing agent to the finished print upon development, because we work with a gas with which we generally cannot make the reducing agent, because these reducing agents mostly are not volatile. The drying operation in this case is not necessary, such print containing the reducing agent which was present in the sensitive layer only. If this would not be sufficient we could apply again a new reducing agent and have two reducing agents present. When we wish to develop with a non-volatile alkali we have to apply a liquid, and we can dry it, but we have only the one reducing agent present which was contained in the sensitive layer. We also can go further and apply a reducing agent after development, in which case we have two reducing agents present in the finished product. We can develop with the non-volatile alkali consequently with a liquid and add the reducing agent at the same time again, in which case we have after drying a print containing two reducing agents. We also

(Testimony of Frans Van der Grinten.)

can apply once more a reducing agent after the development, in which case we have three reducing agents present in the final print. Whatever method of applying, the result, however, always will be that a reducing agent is present in the finished print, and that such a finished diazo-type print with a white background will remain white for extended periods on account of the presence of these [70] reducing agents in the white background of such print. This is the invention of the first patent in suit.

Mr. HOFFMAN: I introduce in evidence the chart entitled "Prior art" as Plaintiff's Exhibit No. 7.

(The chart was marked "Plaintiff's Exhibit 7.")

I also introduce in evidence the chart entitled "Invention in Patent No. 1,821,281" and ask that it be marked Plaintiffs' Exhibit 8.

(The chart was marked "Plaintiffs' Exhibit 8.")

"Q. Will you please explain this invention, particularly as to claims 1, 3, 4, 7, 8, 16, 25, 40 and 41 of this patent?

"A. In order to explain these claims I would like to divide them into three groups, the first group including claims 1, 3, and 4; the second group including claims 7, 8, 16, and 25, and the third group including claims 40 and 41.

"Q. Will you please explain the invention particularly as to the first group of claims, namely, claims 1, 3, and 4?

"A. In this group of claims we have to do with including the reducing agent in the finished print

(Testimony of Frans Van der Grinten.)

as such. Claim 1 calls for including into the finished print a reducing agent, which in this case can be any reducing agent capable of arresting, under normal conditions, the discoloration of the components forming the background of the prints.

Claim 3 calls for the same feature, but here the reducing agent is a reducing aliphatic compound capable of arresting the discoloration—consequently a special sort of reducing agent.

Claim 4 calls for including a reducing agent which must be an amino compound capable of arresting the discoloration, consequently here again a special sort of reducing agent.

“Q. Will you please explain the invention particularly as to the second group of claims, namely, claims 7, 8, 16, and 25?

“A. This group of claims calls for various methods of including [71] the reducing agent into the finished print. Explaining these claims I again wish to refer to Exhibit No. 8. Claim 7 calls for making a print by using a layer containing a diazo compound bleaching upon exposure to light, and a reducing agent as shown on the chart in the middle, such reducing agent being capable of arresting, under normal conditions, the discoloration. When such a diazo-type layer is exposed and developed with an azodyestuff component alkali and dried, then consequently a print is obtained as described in this claim.

(Testimony of Frans Van der Grinten.)

Claim 8 is the same as claim 7, with the exception that here a reducing agent is used which is an amino compound capable of arresting the discoloration.

Claim 16 calls for the use of a sensitive layer containing a diazo compound and a reducing agent capable of arresting the discoloration, and for developing the exposed prints made with such a layer with a developer containing an azodyestuff component and a reducing agent. This is shown on the chart Exhibit No. 8, the sensitive layer containing the reducing agent and the developer containing the azodyestuff component and a reducing agent. This claim consequently calls for a process for making a finished print which contains two reducing agents, one reducing agent added to the sensitive layer and the second added to the print upon development.

Claim 25 calls for a light-sensitive layer containing a diazo compound without a reducing agent, and a development with a developer containing an azodyestuff component and a reducing agent as shown on the left of the chart, Exhibit No. 8, a sensitive layer containing no reducing agent, and development with a developer containing a reducing agent.

“Q. Will you please explain this invention, particularly as to the third group of claims, namely, claims 40 and 41?

“A. The third group of claims of the first patent in suit deal with two claims, 40 and 41, each of which calls for a [72] product which is a light-

(Testimony of Frans Van der Grinten.)

sensitive layer on a base, the composition of the light-sensitive layer being that it contains a diazo compound capable of being decomposed by light, and a reducing agent, the reducing agent in claim 40 being any reducing agent capable of arresting the discoloration of the background of the print which print is to be made with the help of the sensitive layer, and the reducing agent in claim 41 being a reducing amino compound capable of arresting the discoloration of the print which is to be made later on with the sensitive layer.

“Q. Will you explain the term “reducing agent” as it appears in the patent?

“A. In order to explain the term “Reducing agent” I would like to refer first to the opposite of what in chemistry we call a reduction, namely, oxidation. In order to give an illustration of this term I would like to refer to a metal, for instance, copper. If we expose a plate of copper to atmosphere in which oxygen is present, we find that after a certain time the copper plate which originally is blank turns dull and becomes green. On more close examination in the laboratory we will find that on top of the copper plate there has been formed a layer containing a new substance which is entirely different from copper, itself, and which, as we now know in chemistry, is formed by the inter-action of copper with oxygen. The so-formed copper oxide consists of atoms of copper, small particles of copper, and small particles of oxygen which have

(Testimony of Frans Van der Grinten.)

been combined to a new chemical substance, copper oxide. This copper oxide is, as I may remark, by the way, entirely different from copper, and also entirely different from oxygen. The product thus formed I have called an oxide. The process which has taken place upon its formation is called an oxidation. The substance which has caused the oxidation of the copper could be called an oxidizing agent. We can take this copper oxide and mix it with carbon and heat [73] it in a furnace; when we do so the copper will extract, so to say, the oxygen out of the copper oxide, combine itself with the oxygen, and form a compound called carbon dioxide, a gaseous substance, which escapes from the furnace. The result is that the oxygen being again taken out of the copper oxide leaves the copper alone, so that the original copper is again formed back. This process we call in chemistry a reduction. The substance which causes the reduction we call a reducing agent. Thus in this case the carbon under the circumstances as they are prevailing in the furnace is the reducing agent. Of course, in any reduction of this kind an oxidation also is involved. It will be clear that from the point of view of the copper oxide we must say that this copper oxide is reduced to copper. On the other hand, however, we must say from the point of view of the carbon that the carbon is oxidized. Consequently in any reduction automatically an oxidation is involved; that is to say, an oxidation of the reducing agent. We there-

(Testimony of Frans Van der Grinten.)

fore very often say instead of speaking of a reducing agent an oxidizable substance, by which we mean that an oxidizable substance and a reducing agent are really one and the same thing. It will be clear why we called the first-named process an oxidation. We called it an oxidation because oxidation is involved directly in this process. In chemistry, however, we know many reactions which are in an essential part the same as oxidation reactions, but in which no direct oxygen is involved. In order to give you an example thereof we can take a copper plate, expose it to the influence of chlorine—chlorine being one of the well known components of a substance which we all know very well—the salt which we every day use in our food; when we combine copper and chlorine into a compound which we call cupric chloride, and which is quite analogous to copper oxide which is a combination of copper and chlorine. In this case one atom of copper is combined with two atoms of chlorine. In chemistry we call this reaction [74] eventually a chlorination, but in a general way an oxidation. With this cupric chloride we can do the reverse reaction, that is to say, we can again take away from the cupric copper the chlorine totally or in part; when we do so we call this reaction in analogy to the reaction of the oxygen which was taken out of the cupric oxide equally a reduction. Consequently if out of a metal compound with, for instance, chlorine we take out the chlorine by means of another substance, we call

(Testimony of Frans Van der Grinten.)

such a process a reduction. The substance which causes this taking off of chlorine is called a reducing agent. We consequently may define a reducing agent as a substance capable of taking off oxygen out of a chemical compound or a substance which is oxidizable, or we may say a reducing agent also is a substance which is capable of taking off chlorine out of cupric chloride; that is to say, reducing the non-metallic part of a metal salt and taking off the non-metallic part wholly or in part out of such compound.

I wish to back up my statement by citing the literature of a well-known chemist, J. W. Mellor. I have here a photostatic copy of the title page and of pages 506 and 942 of *Modern Inorganic Chemistry*, by J. W. Mellor, printed in London in 1927. On page 506 Mellor states the following:

“A reducing agent is a substance which can remove oxygen from other substances.”

This consequently corresponds with the example I have given of the carbon which is capable of removing the oxygen out of copper oxide.

As a second definition Mellor states:

“A reducing agent is a substance which can decrease the non-metallic part of a compound.”

This corresponds to the example I have given of cupric chloride, a reducing agent being capable of taking one atom of chlorine out [75] cupric chloride, thus decreasing, as Mellor says, the non-metallic part of such a compound by decreasing it from 2 to 1.

(Testimony of Frans Van der Grinten.)

To this definition Mellor adds that the reducing agent also is a substance which can add hydrogen to an element or compound. Hydrogen is the opposite of oxygen, and consequently the addition of hydrogen can be considered as equivalent to a removal of oxygen.

In order to give you a very clear idea of oxidation always being involved in a reducing action, that is to say, the oxidation of the reducing agent, itself, I would like to cite from Mellor on page 942 the following words:

“The word ‘oxidation’ connotes the process of combination of oxygen with an element or compound; and ‘reduction,’ the reverse operation, namely, the withdrawal of oxygen from an oxy-compound. . . . The ideas associated with oxidation and reduction have been extended to include elements other than oxygen. For instance, the transformation of mercuric chloride to mercurous chloride, and finally to mercury by the action of stannous chloride, are processes of reduction. The stannous chloride is at the same time oxidized to stannic chloride. The two operations—oxidation and reduction—are reciprocal in that the oxidizing agent is reduced, and the reducing agent is oxidized by the process. In general, powerful oxidizing agents are readily reduced and powerful reducing agents are readily oxidized.”

In chemistry we know reducing agents of different kinds, we know organic reducing agents and

(Testimony of Frans Van der Grinten.)

inorganic reducing agents, all of which, however, in order to fall under the definition of a reducing agent must be capable of either removing oxygen or decreasing the non-metallic parts of a compound.

“Q. Will you please explain reducing agent as meant in this patent.

“A. Reducing agent as meant in this patent is a substance which has the combined properties of being a reducing agent [76] under the definition as given and of being capable at the same time of counteracting the discoloration of a finished diazo-type print.

Mr. WHITE: I move to strike the answer, your Honor, on the ground that there is no foundation laid for that in the patent. He has made no reference to any such statement in the patent. In other words, if he would point to the patent and show us where a statement of that character is made it would be a proper answer and would be properly admissible. Just defining it that way broadly does not tie it into the patent at all, as I see it.

Mr. HOFFMAN: I will withdraw the question and the answer.

The COURT: Very well.

Mr. HOFFMAN: “Q. Will you please define the term “reducing agent capable of arresting under normal conditions the discoloration of components forming the background of such prints as it appears in claims 1, 3, 4, 7, 8, 16, 25, 40 and 41 of this patent?

(Testimony of Frans Van der Grinten.)

“A. As such reducing agent I would define a substance which has the reducing capacity, according to the foregoing definition, and at the same time the capacity of arresting the discoloration of the background under normal conditions of storage for extended periods in a diazo-type print.

“Q. Will you please give some examples of such reducing agent?

“A. As examples of organic reducing agents I could give, for instance, aldehydes, polyoxy compounds, like citrates, tartrates, glucose, amino compounds, like, for instance thiourea. As an example of an inorganic reducing agent I would like to name sodium thiosulfate.

Mr. WHITE: I think the question and answer should be directed to what is disclosed in the patent, and not to what the witness generally knows in chemistry. I admit that certain of these broad reducing agents that he has mentioned are mentioned in the specif- [77] ication, but there are certain of these that he has mentioned that are not even referred to in the specification, at all. I think that the question should be confined to the specification and claims in suit and not to his broad general knowledge of chemistry. I move to strike out the answer on that ground because the question and the answer are wholly outside the issues broadly.

Mr. HOFFMAN: I beg to call your Honor's attention to line 62 on page 2 to line 70 on page 2, wherein we specifically define the preferred reducing

(Testimony of Frans Van der Grinten.)

agent and define it in a broad term. It defines several classes that may be used. Furthermore, this is a broad invention, where we define the invention first broadly as a reducing agent, that it has to have a certain property in order to be operative in practice, and in order that the invention can be carried out; then in addition to that we define the preferred reducing agents by naming a class of them. I have simply asked the witness to explain the term, what is meant by "reducing agent" and what is meant by these preferred reducing agents. He has already mentioned aldehydes, amino compound, and polyoxy compound, and he is entitled to supplement that explanation in order to give examples.

The COURT: The motion to strike is denied; exception noted.

"Q. In your answer to the preceding question you have listed thiourea as one of the specific reducing agents which may be used. Will you please explain why you term thiourea a reducing agent?

"A. I term thiourea a reducing agent because thiourea is capable of reducing the non-metallic part of a metal salt; for instance, it is capable of reducing cupric chloride, which consists of one atom of copper with two atoms of chlorine to cuprous chloride, which consists of a molecule containing only one atom of copper and one atom of chlorine. I wish to cite an article written by Rathke in the German journal "*Berichte der Deutschen Chemischen Gesellschaft*, a photostatic copy of which I have here, to-

(Testimony of Frans Van der Grinten.)

gether with a translation, [78] the article having appeared in Volume 1, of the issue of 1884, pages 297 to 309. In this article, it says on page 2 of my transcript of the translation:

“If a solution of Thiourea is mixed in the cold with cupric chloride, as long as a precipitate forms, and a possible excess of the reagent is removed through a further small addition of Thiourea, then a white precipitate of microscopical needles consisting of $\text{CSN}_2\text{H}_4 + \text{CuCl}$ in a strongly acid colorless liquid is obtained. This latter contains the combination of one molecule Thiourea with one atom of chlorine, described by Claus, *Ann. Chem. Pharm.* 179, 139, which chlorine in our case has been given off of the cupric chloride in that the latter has been changed to cuprous chloride.” From this it follows that thiourea mixed with cupric chloride strictly falls under the definition of a reducing agent under the definition of Mellor. I have tried this same test several times and I always obtained the exact result which Rathke describes. There may be seen some complication in this test because of the formation of the white precipitates in which the cuprous chloride is in addition projected with thiourea. In order to avoid this complication I have made quite an analogous test in which another salt of copper was used, I namely used cupric acetate, which upon reduction to cuprous acetate does not yield a white precipitate. In order to make sure that my original solution contained cupric acetate I employed a well-

(Testimony of Frans Van der Grinten.)

known test on cupric salts in general, which consists of the addition of ammonia in excess to such solution. If to a cupric salt solution ammonia is added in excess a strong violet blue color is obtained. When I took my original cupric acetate solution and added to it thiourea, let it stand for some minutes, in order to give the thiourea an opportunity to react with the cupric acetate and then added ammonia I found that no more blue color appeared, which indicated that no more cupric salt was present. The cupric salt consequently was reduced by the thiourea.

Mr. HOFFMAN: I now offer in evidence the title page and pages 506 and 902 of *Modern Inorganic Chemistry*, by J. W. Mellor, 1927, as plaintiffs' Exhibit next in order.

(The document was marked "Plaintiffs' Exhibit 9.")

I will also offer in evidence this Rathke article appearing in "*Berichte der Deutschen Chemischen Gesellschaft*," 1884, pages 297 to 309, inclusive, as Plaintiffs' Exhibit next in order.

(The document was marked "Plaintiffs' Exhibit 10.")

"Q. Is thiourea the same as thiocarbamide?

"A. Yes.

"Q. In your answer to a preceding question you cited sodium thiosulfate as a reducing agent. Will you explain why that is a reducing agent?

(Testimony of Frans Van der Grinten.)

“A. Sodium thiosulfate is a reducing agent because it is capable of reducing ferric chloride to ferrous chloride, a similar reaction as the one described earlier for cupric chloride, and consequently falls under the definition of the reducing agent by Mellor. Thiourea, I might remark, is a classical example of a reducing agent—

“Q. Are you referring to thiourea?

“A. I am referring to sodium thiosulfate. Sodium thiosulfate is a classical example of a reducing agent. When a student at the university studies chemistry sodium thiosulfate will be one of the reducing agents he will make an acquaintance with.

“Q. Will you please describe what is meant by the term reducing agent, reducing aliphatic compound, as referred to in claim 3 of this patent?

“A. A reducing aliphatic compound is a substance which is an organic compound of non-aromatic constituents, that is to say it is not the kind of a substance as benzene, pyridene and derivatives thereof, and it has reducing power, and is capable of preventing that same discoloration of the prints.

“Q. Can you name any example of it?

“A. Examples of a reducing aliphatic compound are, for instance, aldehydes, formaldehyde, glycerin aldehydes, citrates, tartrates, glucose, and for instance a substance like thiourea.

“Q. Now, will you please describe what is meant by the term reducing amino compound as referred to in claims 4, 8, and 41 of this patent?

(Testimony of Frans Van der Grinten.)

“A. An amino compound is an organic substance, that is to say a substance which contains carbon, and which at the same time as a constituent part contains so-called amino groups. An amino group is built up from one atom of nitrogen and two atoms of hydrogen, which in the chemical formula is NH_2 . I wish to refer to a chart which I have prepared showing the formula of thiourea as an example of an amino compound, in which formula you will see in the center a C indicating a carbon atom and connected with the carbon atom NH_2 , and one more NH_2 , consequently with two amino groups. In order to back up this statement I would like to refer to certain literature, as, for instance, to a dictionary of chemical terms by James F. Couch, of New York, 1920, pages 10 and 11. Couch says under the heading “Amino,” “A prefix used to denote content of NH_2 , the amino group especially among aliphatic compounds not of acid nature. It is used interchangeably with amido, the latter term being preferred, by many authors for aromatic derivatives.” Also I wish to refer to Funk & Wagnalls New Standard Dictionary of the English Language, New York and London, 1929, page 92, which says: “Amino, a combining form indicating presence of the radical NH_2 in the compound.”

From both of these citations, of which I have photostatic copies here with title pages, it follows clearly without any doubt that a substance containing one or more NH_2 groups is to be considered [81] as an amino compound.

(Testimony of Frans Van der Grinten.)

Mr. HOFFMAN: I offer this title page and pages 10 and 11 of the Dictionary of Chemical Terms by James H. Couch and the title page and page 92 of Funk & Wagnalls Dictionary in evidence as Plaintiffs' Exhibit 11.

(The documents were marked "Plaintiffs' Exhibit 11.")

I also wish to offer in evidence the chart on thiourea as plaintiffs' exhibit next in order.

(The chart was marked "Plaintiffs' Exhibit 12.")

"Q. Now, will you please state whether thiourea, when present in the background of a diazo-type print acts to arrest a discoloration of the background of said print?

"A. Thiourea does, yes. I have made tests with these diazo prints containing none and containing thiourea and I always found that the print which does contain thiourea did not discolor appreciably in the time in which the print containing no thiourea did discolor considerably. I have made these tests, in which all the other conditions in both prints, which had to be compared, were entirely equal, in both tests.

"Q. Will you please state whether or not sodium thiosulfate when present in the background of a diazo print acts to arrest the discoloration of such background?

"A. It does, and I have made that sodium thiosulfate test in exactly the same way as described in my foregoing answer for thiourea, and I obtained exactly the same result.

(Testimony of Frans Van der Grinten.)

“Q. You first filed application for patent in The Netherlands on the invention described in this patent, did you not?

“A. I did.

“Q. Please state how many applications and give the dates of the filing of each.

“A. We filed in Holland three applications, the first on December 11, 1926, the second on February 10, 1927, and [82] the third on March 16, 1927.

“Q. Will you please state the relation of those three applications to this patent in suit?

“A. This patent is based upon the combined subject-matter of these three Netherlands applications.

“Q. When did you file the application in this country corresponding to this patent in suit?

“A. On June 6, 1927.

“Q. Then you filed the application on which this patent in suit issued within one year from the date of the filing of the first application in The Netherlands?

“A. Yes, we did.

“Q. I hand you herewith a certified copy of The Netherlands application filed December 11, 1926, together with a translation thereof into the English language, and ask you whether that is the application that you filed in The Netherlands.

“A. Yes, it is.

Mr. HOFFMAN: I offer this certified copy of the Holland application filed December 11, 1926,

(Testimony of Frans Van der Grinten.)

together with the translation thereof, in evidence as Plaintiffs' Exhibit 13.

(The document was marked "Plaintiffs' Exhibit 13.")

"Q. I hand you a certified copy of the application filed in The Netherlands on February 10, 1927, together with the translation thereof, and ask you to state whether or not that is the application that you filed in The Netherlands.

"A. Yes, it is.

Mr. HOFFMAN: I offer this certified copy of the Holland application filed February 10, 1927, together with the translation thereof, in evidence as plaintiffs' exhibit next in order.

(The document was marked "Plaintiffs' Exhibit 14.")

"Q. I hand you herewith a certified copy of the Holland [83] application filed March 16, 1927, together with the translation thereof, and ask you to state whether that is the application which you filed in Holland.

"A. Yes, it is.

Mr. HOFFMAN: I offer in evidence the certified copy of the Holland application filed March 16, 1927, together with the translation thereof, in evidence as plaintiffs' exhibit next in order.

(The document was marked "Plaintiffs' Exhibit 15.")

"Q. Now, will you briefly describe the subject-matter of these three Holland applications?

(Testimony of Frans Van der Grinten.)

“A. In the first-named Holland application a special class of diazo compounds is described which are especially useful in the positive diazo processes, because they yield especially dark, mostly a black color, with certain azodyestuff components. In the second application there is described the use of reducing agents for preventing discoloration of the background of diazo-type prints. In the third application there is described principally a reducing agent which apart from the property of preventing discoloration has the property of inhibiting the coupling capacity of a component so that these reducing agents are particularly useful for use in so-called two-component papers.

“Q. Will you please refer to claims 1, 3, 4, 7, 8, 16, 25, 40 and 41 of this patent and state which of those three Holland applications fully describes the invention recited in those claims?

“A. The second-named Holland application fully describes the contents of these claims.

Mr. HOFFMAN: Now, your Honor, inasmuch as we are relying upon the dates of the foreign applications, I would like to read for the convenience of the court into the record section 4887, Revised Statutes of the Patent Laws of the United States, [84] or 35 U. S. C. A. Section 32.

Mr. WHITE: I will stipulate that may go in without reading.

The COURT: I do not think you need read it. Do you want to state the substance of it?

(Testimony of Frans Van der Grinten.)

Mr. HOFFMAN: No, I just wanted to have it a part of the record.

“Q. Now, you are familiar with the Van der Grinten patent 1,841,653 in suit, are you not?

“A. Yes, I am.

“Q. Will you please describe the invention to which this patent relates?

“A. In explaining the invention of this patent I would again like to refer to the charts Nos. 7 and 8, as I did before in explaining the first patent in suit, and I also wish to refer to the explanation I have given when dealing with the first-named patent. In that explanation we have seen that in principle, the after treatment of a diazo print in order to make it stable against the further action of light can be confined exactly to an addition of a substance. We have seen that in a layer which only contained the diazo compound we only had to add the azodyestuff component and the alkali in order to obtain a print which not only was developed, but was also fixed. We see the same thing with the processes which work with the so-called two-component layers, that is to say, with a layer which contains the diazo compound and the azo coupling component, because there we only had to add to the print an alkali, be it a volatile or be it a non-volatile alkali. The invention of the second patent in suit not only deals with the carrying out of the developing step, but, or one can call it as well, the fixing step, that is to say it was a step by which

(Testimony of Frans Van der Grinten.)

these necessary substances are introduced into the exposed print. This in substance is described in the second patent in suit on page 1, lines 1 to 48. In the so-called two-component process we have the first form of a [85] process in which it is possible to fix a positive diazo print by mere addition of a substance. On account of the dry development this process has a great advantage over older processes like, for instance, the blueprint process, in which we had, as I explained before, to take out substances for obtaining a fixation. Here we only have to add something. We have to add ammonia, which we even could do by only bringing this exposed print in a room in which ammonia vapors were present. The advantage this process had over the old processes would have led to a great success of this process had not this process had a number of disadvantages. The treatment with these ammonia fumes mostly lasted for a long time, especially in low temperatures in the winter; this treatment took some times more than an hour, and it lasted such a long time before these ammonia fumes had sufficiently penetrated into this picture to insure a complete development. On the other hand, these ammonia vapors were injurious and it was rather difficult to avoid the ammonia vapors being inhaled by the workmen who had to work with these prints. These two drawbacks made it that this process had not the success which could have been expected therefrom as described. That is substantially de-

(Testimony of Frans Van der Grinten.)

scribed in the patent, page 1, lines 57 to 75. The old process is shown on chart No. 7, on the left-hand chart, in which we developed by inserting the print in a bath, we had a very quick development because the substance dissolved in the alkali or liquid could penetrate into the print in a very short time. The print immediately appeared, and we had at the same time in this process an advantage that we have not to do with the injurious ammonia vapors. However, as will be clear with this old method, with this bath, of course with the necessary consequence of drying, had no great advantage over the blueprint process in which we also have an after treatment in which the whole print had to be submerged in water. The submerg- [86] ing of these large-sized prints with which we had mostly to do in the technical reproduction always has been a difficult problem. The paper becomes weak by being wet on both sides, and it is rather difficult to dry these prints. Therefore, the advantage of a process in which merely something would have to be added was very great. This is described in the patent on page 1, lines 76 to 93.

I may remark that in both these processes we treat the exposed prints with an excess of the substance which had to be introduced. In the case of the ammonia fume development we introduced a print in a room in which there was much more alkali than was needed for the carrying out of the develop-

(Testimony of Frans Van der Grinten.)

ing reaction in the print. The same we had in the bath. In both cases we left the exposed print in the developing medium as long as it was necessary to obtain a complete development.

Going now to the invention of the second patent in suit, I can say that the basic underlying idea of this invention is the exposed print is treated on its exposed surface only with an extremely thin film of an alkali liquid which may, if necessary, contain also an azodyestuff component so that a certain quantity and no excess of the developing substance is added to the exposed surface of the print. This is described in the patent, page 1, line 94 to line 5 on page 2.

The chemical reaction takes place automatically after the thin film of developing substance has been added to the exposed surface. In the old processes we left the print in contact with the developing substance until the reaction had been completed. In this case we do the opposite, we add a certain quantity of the developing substance and do not wait, because the inter-action between the exposed surface and the developing chemical takes place automatically. The print, in this case, as soon as the developing liquid has been applied to it, can be left entirely to itself. [87] It can, for instance, be sent to the user, it can be mailed, it can be rolled up, and the further reaction, which might need some minutes more to complete, takes place automatically without having to wait therefor. The fact

(Testimony of Frans Van der Grinten.)

that we only add an extremely thin film of liquid brings the added advantage that these prints are also practically immediately dried. This, in substance, is described on page 2, lines 63 to 69.

By this method we avoid the disadvantages of the old method and combine all the advantages of the old method. We now develop in a few seconds, consequently quite rapidly, and we avoid the ammonia vapors. Our prints are practically dry immediately after the development, so that there is no disadvantage over the perfectly dry development method. This is in substance described on page 2 of the patent, lines 6 to 18. In the patent there is a drawing which shows a cross section of a device with which the thin film of developing liquid can be brought into contact with the surface to be developed. A lower and an upper roller are indicated, which rollers have a length that conform to the width of the prints which have to be developed. The lower roller revolves in a trough indicated by the letter C in the direction of a watch. The upper revolves in the opposite way. The print, indicated by H, is introduced over a feeding table with the surface to be developed upward over the upper roller, it passes along this roller and then through the two rollers. It is clear that the lower roller takes the developing solution out of the trough, brings it up to the point where the two rollers are in contact, where only part of the developer passes through this line of contact with the print and the

(Testimony of Frans Van der Grinten.)

rest flows down again into the trough. The print leaving the two rollers has on its surface an extremely thin film of the developing liquid, and is practically dry. The developers which may be used are aqueous solutions of alkaline or alkaline [88] re-acting substance, and if necessary, mixed with azodye components as phloroglucinol, resorcinol, naphthol, and the like. The developers also can contain substances for preventing the discoloration. This is in substance described on page 2, lines 84 to 94. The alkaline substance may be potassium or sodium carbonate eventually mixed with buffer salts such as citrates and the like. This is in substance described from line 103 to line 110 on page 2. The substances which may be added to the developing liquid for the arresting of the discoloration in the finished print are reducing agents which are stable in the alkaline medium of the developer. This, in substance, is described in lines 94 to 102 on page 2 of the patent.

“Q. Will you please explain the invention, particularly as to claims 1, 3, 4, 6, 8, 11, 13, 15, 16, and 18?

“A. For explaining these claims I would like to divide them into four groups. The first group containing claims 1 and 3; the second group claims 4, 6, and 8; the third group claim 11 only, and the fourth group claims 13, 15, 16, and 18.

“Q. Will you please explain the invention particularly as to the first group of claims, namely, claims 1 and 3?

(Testimony of Frans Van der Grinten.)

“A. In the first group of claims, claim 1 is the broadest. It calls for two features, the first being a special composition of the developing liquid which is an alkaline liquid, containing an azodyestuff component and a reducing agent non-decomposable by alkali. The second feature is that this developing liquid is impressed upon the surface to be developed in the form of a uniformly thin film. Claim 3 calls for the following three features. The first feature, composition of the developing liquid which in this case is an alkaline liquid and containing an azodyestuff component. The second feature is that this alkaline liquid is impressed upon the surface to be developed in a uniformly thin film. The third feature is that by doing [89] so an amount of azodyestuff component not substantially in excess of that required to couple with the diazo compound is applied.

“Q. Will you please explain the invention with particular relation to the second group of claims, namely, claims 4, 6, and 8?

“A. In this group of claims, claim 4 is the broadest and calls for four features. The first feature relates to the composition of the developing liquid, which is a liquid containing a non-volatile alkaline substance. The second feature is that with this liquid the surface throughout its entire area is saturated. The third feature is that this is done by spreading the liquid to said surface in the form of a uniformly thin film. The fourth feature is that

(Testimony of Frans Van der Grinten.)

this is done in such a quantity which is substantially corresponding to that required for development.

Claim 6 calls for the same features as claim 4, but the developer contains in addition to the non-volatile alkaline substance a reducing agent.

Claim 8 calls for the same features as claim 4, but here the developer contains in addition to the non-volatile alkaline substance the azodyestuff component and a reducing agent.

“Q. Will you please explain the invention particularly as to the third group of claims, namely, claim 11?

“A. Claim 11 calls for five features. The first feature is that the developing liquid contains a non-volatile alkaline substance and an azodyestuff component. The second feature is that this alkaline liquid is spread on said surface in a uniformly thin film. The third feature is that this is done by saturating—I am sorry, I mixed up the second and third features. May I restate the features of this claim, please?

“Q. Yes, please restate it again.

“A. Claim 11 calls for five features. The first feature is that the developer consists of a developing liquid containing [90] a non-volatile alkaline substance and an azodyestuff component. The second feature is that the surface is saturated throughout its entire area with this liquid. The third feature is that this is done by spreading the liquid over the surface in the form of a uniformly thin

(Testimony of Frans Van der Grinten.)

film. The fourth feature is that the quantity thus applied is substantially corresponding to that required for the developing. The fifth feature is that in the light-sensitive layer there is used a special diazo compound of a type which cannot be used together with an azodyestuff component.

“Q. Will you please explain the invention with particular relation to the fourth group of claims, namely, claims 13, 15, 16, and 18?

“A. In this group of claims claim 13 is the broadest. It calls for four features. The first feature is that the developing liquid contains a non-volatile alkaline substance. The second feature is that the surface to be developed is saturated throughout its entire area with this liquid. The third feature is that this is done by momentarily wetting the exposed surface with an excess of said liquid and removing the excess immediately thereafter so as to depose a uniformly thin film of the liquid to the surface. The fourth feature is that thus a quantity of developing liquid is applied to the surface, which substantially corresponds to that required to effect development of the surface. Claim 15 calls for practically the same features as claim 13 but here the developer contains in addition to the non-volatile alkaline substance a reducing agent. Claim 16 again calls for the same feature as claim 13 but here the developer contains in addition to the non-volatile alkaline substance an azodyestuff component. Claim 18 calls for the same features as claim 13 but the

(Testimony of Frans Van der Grinten.)

developer contains in addition to the non-volatile alkaline substance an azodyestuff component and a reducing agent. [91]

“Q. You first filed application for patents in The Netherlands for the invention described and claimed in this patent, did you not?

“A. Yes.

“Q. Please state how many applications and the date of each.

“A. We filed applications in Holland, one on May 23, 1928, and one on August 22, 1927.

“Q. When did you file the application in this country corresponding to this patent in suit?

“A. On August 11, 1928.

“Q. Then you filed the application on which this patent in suit issued within one year from the date of filing of the first-filed application in The Netherlands?

“A. Yes, we did.

“Q. I now call your attention to the certified copy of the application filed in Holland on August 22, 1927, and the translation thereof into the English language which is a part of the File Wrapper of this patent, Plaintiffs' Exhibit No. 4, and ask you to state whether this is the application as filed in the Holland Patent Office.

“A. Yes, that is it.

“Q. I hand you a certified copy of the application filed in The Netherlands on May 23, 1928, together with a translation in the English language, and ask you to state whether this is the application that you filed in The Netherlands.

“A. Yet, it is.

(Testimony of Frans Van der Grinten.)

Mr. HOFFMAN: I offer the certified copy of the Holland application filed May 23, 1928, together with a translation thereof in evidence and ask that it be marked Plaintiffs' Exhibit 16.

(The document was marked "Plaintiffs' Exhibit 16".)

"Q. Now, will you please refer to claims 1, 3, 4, 6, 8, 11, 13, 15, 16 and 18 of this patent and state whether the first- [92] filed application in The Netherlands fully describes the invention recited in these claims.

"A. The first-filed application in Holland fully describes the invention described in these claims.

"Q. I again hand you the certified copy of the File Wrapper and Contents of patent No. 1,841,653, and ask you to inspect the oath in this application and state whether or not it lists these two applications about which you have testified.

"A. Yes. It does.

"Q. Will you please describe briefly the history of the diazo-type art prior to the inventions in the two patents in suit. I am referring particularly to the subject-matter set out in lines 39 to 79 on page 1 of the first Van der Grinten patent in suit.

"A. The positive diazo-type process was first practiced by Arthur Green in the year 1890. Green made a light-sensitive layer consisting of a very special diazo compound, the so-called diazo primulin, a diazo compound made from a dyestuff well known at that time and called primulin. The process

(Testimony of Frans Van der Grinten.)

was carried out exactly in the way as shown on Exhibit No. 7 in the left-hand part. Green obtained a German patent on his invention, and I have a photostatic copy of it here. This German patent is No. 56,606. I also have a translation of this patent.

In the year 1895 a German scientist by the name of Andresen found not only the diazo compound of primulin was capable of forming positive pictures in the way described, but that practically any diazo compound could be used for that purpose. Andresen indicated some special diazo compound which might advantageously be used. I have here an article which appeared in the *Photographic Correspondenz*, 1895, and a translation of this article.

In 1901 Ruff and Stein published an article in the "*Berichte der Deutschen Chemischen Gesellschaft*," the German periodical, [93] in which they described that a diazo compound named diazo carbazol is advantageously used for the process. I have here a photostatic copy of this article and a translation thereof. None of those processes has ever been carried out in practice. More than 20 years later Kalle invented the process as described in the left-hand part of Exhibit No. 7, the process with two components in the layer and the ammonia fumes development. He used for this process a special class of diazo compound, so-called diazo anhydrides, which had particularly the advantage of being capable of being mixed with azodyestuff

(Testimony of Frans Van der Grinten.)

components in the sensitive layer and thus forming stable layers as long as a sufficient amount of acid was present. I have a photostatic copy of Kalle's British patent 210,862.

I wish to refer to another Kalle British patent, No. 234,818, in which Kalle describes other special diazo compounds for the same purpose.

In the year 1927 we entered the field with the two inventions which I have already described.

"Q. You proceeded to introduce the inventions of the patents in suit commercially in the various countries, did you not?

"A. Yes, we did.

"Q. Were they favorably received?

"A. They were very favorably received. As I have already indicated, the state of the art the moment we entered the field was that we had on one hand to do with the ammonia fumes development process, and on the other hand with prints which had a strong discoloration. Although the ammonia fumes development process had a certain attraction for many users, one could make the prints in an entirely dry way, and could do away with all the difficulties they had in developing, for instance, blueprints. The success of this process, especially amongst users who had had already prints for months in their files, was [94] not so great. It very often occurred that a user started on this process and after a few months rejected it again because he then had found out the difficulty he was up

(Testimony of Frans Van der Grinten.)

against with workmen very often complaining about these injurious vapors. Those who had to use the print complained about the discoloration of these prints. Although I must say that the Kalle invention was the first step to carry out the positive diazo-type process in practice one must, on the other hand, say that this first step was a very incomplete one. It was only after we had entered the field with our two inventions, the first adding a reducing agent to the finished print in any way, and doing away with the discoloration, and using the thin film as described in the second patent, thereby getting a quick and odorless development—only, I say, after these two inventions had been made did the diazo-type processes become a final success, and I may say especially in this country, where the drawback of the ammonia fumes was felt much more than, for instance, in many European countries on account of the fact that very often these prints had to be made in this country in big buildings and in big cities where it was very difficult to get rid of these ammonia fumes.

“Q. Then your inventions have made positive diazo-type prints a great commercial success?

“A. They have.

“Q. Did any of these patents or publications of the prior art prior to your inventions disclose the use of a reducing agent to prevent discoloration with the background of the finished print?

“A. No.

(Testimony of Frans Van der Grinten.)

Mr. HOFFMAN: I offer in evidence a copy of German patent No. 56,606, together with a translation thereof, and ask that it be marked Plaintiffs' Exhibit 17.

(The patent was marked "Plaintiffs' Exhibit 17.")

I offer in evidence a copy of the Andresen article in [95] Photographische Correspondenz, together with a translation thereof, in evidence as Plaintiffs' Exhibit 18.

(The document was marked "Plaintiffs' Exhibit 18.")

I offer in evidence a copy of the Ruff and Stein article, pages 1668 to 1670, Berichte, 34, 1901, together with a translation thereof, and ask that it be marked Plaintiffs' Exhibit 19.

(The document was marked "Plaintiffs' Exhibit 19.")

I offer in evidence a copy of British patent No. 210,862 as Plaintiffs' Exhibit 20.

(The patent was marked "Plaintiffs' Exhibit 20.")

I offer in evidence a copy of British patent 234,818, as Plaintiffs' Exhibit 21.

(The patent was marked "Plaintiffs' Exhibit 21.")

Cross Examination.

"Q. Doctor Van der Grinten, you testified yesterday, did you not, that you had introduced your

(Testimony of Frans Van der Grinten.)

process and your paper and developer throughout various countries of the world.

“A. Yes, I did.

“Q. Did you obtain letters patent in these various countries?

“A. Yes, we obtained letters patent in nearly 23 countries of the world.

“Q. Based upon the original Dutch applications?

“A. Based upon the same applications that the United States patents were based upon, and in parts the same as the United States patents.

“Q. In other words, did you obtain letters patent in Australia?

“A. Yes, we did.

“Q. Did you obtain letters patent in Great Britain?

“A. Yes, we did.

“Q. Did you obtain letters patent in France?

“A. Yes, we did.

“Q. And of course you did in The Netherlands?

[96]

“A. And of course we did in The Netherlands.

“Q. Did you obtain letters patent in Germany?

“A. In Germany we applied for a patent, but in Germany we met strenuous opposition against the patents, like in different other countries, too. For instance, in Holland we also had opposition against our patents, and in Czechoslovakia, and in

(Testimony of Frans Van der Grinten.)

different other countries, and even in Great Britain, nevertheless we obtained the patents there.

“Q. You did not obtain letters patent in Germany, though?

“A. So far, no. In the meantime we have sold in Germany the applications——

Mr. HOFFMAN: If your Honor please, I object to this line of questions because I think it is entirely immaterial and irrelevant what happened in other countries with respect to the patents.

Mr. WHITE: The purpose of this testimony, your Honor, is that I want to show to the Court the same controversy which is involved in this suit was before the German Patent Office in 1929 and 1930, and decided adversely to the plaintiff here.

The COURT: I don't think that is material. If that is evidence against the plaintiff then the fact that he received patents in 22 countries would be evidence in his favor. I don't think the Court would be influenced by either of those circumstances.

Mr. WHITE: The fact that the German patent office had under consideration the same subject-matter that is involved in this suit I think is material. What I propose to show is that the Kalle Company—the company mentioned by the plaintiff—filed an application in Germany in 1928 or 1929, which application the Van der Grintens opposed, and the opposition was based on contentions similar to the contentions which are made in this suit. The same subject-matter was involved. The German

(Testimony of Frans Van der Grinten.)

Patent Office rendered a decision. I have here the decision of the German Patent Office in that respect.

[97]

The COURT: Well, with reference to that, if there is a decision I think you would have a right to refer to it. You would have a right to refer to it without introducing it in evidence, just as you would have a right to refer to decisions in any District Court or any Circuit Court of this country, or to a decision of a court of any country. The objection is overruled; exception.

Mr. WHITE: I have here, your Honor, a certified copy of the File Wrapper and Contents of letters patent No. 526,370, issued in Germany to Kalle & Company, together with an official translation thereof, certified to by the United States Consul. I would like to have it marked for identification at this time as Defendant's Exhibit A.

Mr. HOFFMAN: Your Honor, I object to the introduction of that because the date is entirely too late. The earliest date, even if we can only get the benefit of our United States date, we are still a year ahead of that application or patent. The effective date of that patent as a publication is May 13, 1931. Our filing date of our first patent over here is June 6, 1927. This is five years later than the filing date of our application here in this country. That is not taking into account our foreign application, which is February 10, 1927. This is five years too late. The date is entirely too late to be effective

(Testimony of Frans Van der Grinten.)

even as a publication. That is the purpose counsel intends to use it for.

Mr. WHITE: No, that is not the purpose for which I intend to use it.

The COURT: As I understand it, there was an application in Germany for a patent, just as there was an application in this country for a patent. Germany denied the patent and stated its reasons. The Court may read the opinion given there, just as I may read the opinion of any court in this country, any District Court or any Circuit Court, or the court of any other country. [98] Objection overruled; exception.

(The document was here marked "Defendant's Exhibit A, for identification.")

"Q. Dr. Van der Grinten, do you recall that on or about the 16th day of February, 1928, the firm of Kalle & Company filed an application for letters patent in Germany?

"A. I recall a good many of these patent applications of Kalle; will you give me an idea on what subject this is?

"Q. Do you recall an application the subject-matter of which was the addition of certain compounds to diazo sensitive layers, the compounds being derivatives of thiocarbonic acid such as thio-urea?

"A. I certainly remember that application by Kalle in Germany.

(Testimony of Frans Van der Grinten.)

“Q. Do you recall the claim made by Kalle & Company in that application? I will hand you this translated copy and ask you to read that to the Court.

“A. Process for making diazo photographic prints lasting, characterized by the fact that sulfur or selenium compounds, especially derivatives of thiocarbonic acid, preferably thiocarbamide, are added to the light-sensitive layer.

“Q. Now, I ask you, Doctor, is the substance thiocarbamide also known as thiourea?

“A. It is.

“Q. Did your firm in 1929 employ as German counsel the firm of Karsten & Wiegand?

“A. We did.

Mr. HOFFMAN: I object to that question, your Honor.

The COURT: The question is harmless. Objection overruled; exception.

“Q. On or about January 7, 1929 did your German counsel file an opposition to the issuance of letters patent to Kalle & Company to which we have just referred?

“A. As far as I remember, yes. [99]

“Q. Do you remember the contentions which were made in that opposition proceeding?

“A. Not quite distinctly any more. The main objections I remember.

“Q. What were the main objections?

“A. The main objections were that the claim in this patent reading for a substance having re-

(Testimony of Frans Van der Grinten.)

ducing properties and being at the same time an amino compound had already by the previous publication of our French patent corresponding with the first patent in suit been so clearly published that there was no more invention in the fact that Kalle suggested thiocarbamide as a substance capable of preventing the discoloration of finished prints. A second argument which we used against this patent application was that in the French patent as it was published there was also suggested to be used so-called anti-oxygenes of Moureu. An argument derived from the second argument was that Moureu mentioned in his publications thiourea, by name. So we were of the opinion that when we in our French patent published, as I stated yesterday, in connection with the first patent in suit exactly in the same wording, using a reducing agent, preferably used amino compounds, preferably anti-oxygens of Moureu, we were of the opinion, I say, that nobody else could get a valid patent after this publication, which claimed the use of thiourea for preventing the discoloration of diazo-type prints. The German patent office, however, did not agree with us——

“Q. Just a minute, please, Doctor. Referring again to this official translation of the File Wrapper and Contents of the opposition proceeding, will you kindly state whether or not your contentions are set forth in this paper and, if so, at what pages? I want you to do that for the benefit of the Court and of the record. [100]

(Testimony of Frans Van der Grinten.)

“A. That will take me an hour.

“Q. Just glance at it briefly, Doctor. I think the record will speak for itself.

“A. I think I cannot do it in a short time, because it is too difficult to do in a short time.

Mr. WHITE: Then I will pass it. I might state for the benefit of the Court and also for the record that the contentions of the firm of Van der Grinten made against the issuance of letters patent to Kalle & Company are set out on pages 9 and 14 of the official translation of this File Wrapper.

The COURT: Is it 9 and 14, or is it 9 to 14?

Mr. WHITE: I would say 9 to 14.

“Q. As a matter of fact, the word “thiourea” was never mentioned in your French patent, was it?

“A. The word “thiourea” was not mentioned in the French patent.

“Q. The word “thiourea” was not mentioned in your United States Applications?

“A. No, it was not mentioned in the United States applications.

“Q. Nor in any application you ever filed in any country?

“A. Yes, in making other applications we used the word “thiourea”, but we did not in the United States applications.

“Q. The German Patent Office rendered a decision in this opposition proceeding. Can you state briefly what the substance of that decision was, as you recall it?

(Testimony of Frans Van der Grinten.)

Mr. HOFFMAN: That is objected to, your Honor.

The COURT: Why ask the witness? You have it there.

Mr. WHITE: I will strike the question.

“Q. You just testified, Doctor Van der Grinten, that your French patent, together with your United States patent discusses or mentions organic reducing agents and they are preferably used with anti-oxygenes of Moureu; is that correct?

“A. I may say it is nearly correct, it is not altogether correct. [101]

“Q. Will you kindly read again to the Court from the first patent in suit, No. 1,821,281, at page 2, lines 62 to 71 inclusive?

“A. ‘Preferred reducing agents are organic substances such as aldehydes, amino compounds, aliphatic amido-compounds, polyoxy-compounds or the like, and the reducing agents are preferably used together with very small quantities of the substances with catalytic action defined as “anti-oxygenes” by Moureu (Chemisch Zentrallblatt 1922 I 1317; Comptes Rendus 174 pages 258-264 and following).’

“Q. You have stated that in your opinion thiourea is a reducing amino compound: Is that your testimony?

“A. That is my testimony.

“Q. Do you now testify that thiourea is also an anti-oxygene of Moureu, so-called?

(Testimony of Frans Van der Grinten.)

“A. It is because it is staed by Moureu in his list of anti-oxygene substances.

“Q. Does this substance act as a reducing agent when used in extremely minute quantities, in the quantities suggested by Moureu as anti-oxygenes?

“A. It does on certain theories, at least when we follow the theories which Moureu, himself, had on this subject.

“Q. You made the contention in the German patent office proceeding that thiourea in the examples given by Kalle was not only an anti-oxygene of Moureu but also a reducing amino compound; is that not correct, as you recall it?

“A. I think we have used that argument, but my memory is not so splendid that I can know that, because it is so long ago.

“Q. Is it or is it not a fact that thiourea when used in extremely minute quantities, say molecular quantities of $1/40000$ or $1/100000$ part, that in that case it is known as an anti-oxygene of Moureu, but in larger quantities than that it may act as you have stated in your opinion as a reducing agent?

[102]

“A. In my opinion and the opinion of Moureu it does not make any difference whether the substance is used in small or in large quantities at all. The action of a substance as such, that is to say, the specific action of a certain substance when acting has nothing to do with the quantity of such substance. A substance acts in a certain way, or acts not in a certain way.

(Testimony of Frans Van der Grinten.)

“Q. Then in the United States application, and particularly in those paragraphs which you have just read to the Court, when you said that reducing agents are preferably used together with very small quantities of substances with catalytic action defined as anti-oxygene by Moureu, you naturally are not referring to thiourea in both instances, once as a reducing agent and once as an anti-oxygene of Moureu, are you?

“A. I cannot see how that is pertinent here.

Mr. WHITE: Will your Honor instruct the witness to answer the question?

Mr. HOFFMAN: I submit that he is asking the witness about something that we never touched on in our direct examination at all, your Honor. I therefore object to the question on that ground.

The COURT: Objection overruled; exception.

“A. I might answer this question ‘Yes’ or ‘No’. In one way we may not be referring to thiourea as an anti-oxygene, and in another way we may, because thiourea can act as a reducing agent and as an anti-oxygene in a catalytic way absolutely at the same time. These questions of internal chemistry I might say which are involved in these processes are not enough known so that I could make a distinction between the reducing action and the purely catalytic action.

Mr. WHITE: At this time I would like to introduce in evidence as Defendant’s Exhibit A the paper I had marked Defendant’s Ex- [103] hibit A

(Testimony of Frans Van der Grinten.)

for identification, that is to say, the certified copy of the File Wrapper and Contents of the German letters patent 526,370, and the official translation thereof.

Mr. HOFFMAN: I would like to know for what purpose that is being offered, whether for the prior art or as a pleaded publication.

Mr. WHITE: As a pleaded publication.

Mr. HOFFMAN: It never has been pleaded.

Mr. WHITE: Then I can introduce it to show the state of the art.

The COURT: Objection overruled; exception.

Mr. HOFFMAN: I submit that it is too late, your Honor, to show the state of the art.

The COURT: It was later than the filing date of the application?

Mr. HOFFMAN: He is only showing the state of the art since 1928.

Mr. WHITE: It is also to show the German Patent Office had under consideration the same question that it involved in this suit. I submit to your Honor that it is admissible under that rule, and also it is admissible under 28 U. S. Annotated, Section 674, which states that certified copies of a foreign patent may be admitted in evidence.

The COURT: To show the prior art it must have been prior to the application for the patent.

Mr. WHITE: I am not particularly interested in that question, your Honor, but I am particularly interested in showing your Honor that this controversy has already been decided.

(Testimony of Frans Van der Grinten.)

The COURT: And that the patent was denied, and giving the reasons why it was denied?

Mr. WHITE: That is it, your Honor, yes.

The COURT: It is admitted for that purpose. I have already [104] discussed the theory on which I have admitted it.

(Defendant's Exhibit A for identification was received in evidence and marked "Defendant's Exhibit A.")

"Q. You testified yesterday, Doctor, with respect to a reducing agent, and gave us some definitions of that. In the first part of your testimony you stated that when copper was exposed to atmosphere the copper turned slightly green: Is that correct?

"A. It did.

The COURT: Are we interested in that in this case?

Mr. WHITE: Not in copper, your Honor. No.

The COURT: Why go into it? The witness testified that certain chemicals were reducing agents. Are those chemicals reducing agents?

Mr. WHITE: That is what you would like to know, is it not?

The COURT: He agreed that they are?

Mr. WHITE: No. Your Honor, and particularly with respect to thiourea. That is the bone of contention in this case, if I may put it that way.

The COURT: In explaining the term "reducing agent" the doctor went into a number of things with which we are really not concerned. The ques-

(Testimony of Frans Van der Grinten.)

tion is whether or not these particular chemicals mentioned constitute a reducing agent. That is the question, as I understand it.

Mr. WHITE: That is it, your Honor. May I just briefly refer to his definition, your Honor?

The COURT: Very well.

“Q. You stated yesterday, Doctor, that a reducing agent may be defined in two ways. Will you repeat that again, please, the two definitions of a reducing agent?

The COURT: Did he not quote from authorities? for instance, did he not quote from the dictionary? [105]

“A. I quoted from Mellor.

“Q. I am particularly interested in this definition which you stated yesterday, and I want to ask you again if this is still your testimony; in other words, you confirm Mellor in this regard. A reducing agent is a substance which can decrease the non-metallic part of a compound.

“A. I quoted that from Mellor. May I have just a glance at Mellor, please? Yes, to decrease the non-metallic part of a compound.

“Q. And particularly a metal salt?

“A. As an example he gives a metal salt.

“Q. As a matter of fact, in the diazo type or the diazo print which is made in accordance with these processes which we have been discussing, the decomposition products remaining in the exposed print are not metal salts, are they?

“A. No.

(Testimony of Frans Van der Grinten.)

“Q. So that if the substance thiourea were placed in the finished print and if it so happened that the discoloration of the background of the print was arrested for an appreciable period of time, it does not necessarily follow that thiourea has had a reducing action on the decomposed products remaining in the background, does it?

“A. It does not necessarily follow; that is to say, it does not one hundred per cent. necessarily follow, but in my opinion it at least follows for 99 per cent. When an oxidation reaction is involved in a process and a reducing agent—a substance which falls under the definition of a reducing agent, a substance, for instance, such as thiourea which is capable of reducing cupric chloride to cuprous chloride—is capable of counteracting such a reaction, then 99 out of 100 chemists will say that this is due to the reducing action of that substance.

“Q. Is thiourea oxidized in the diazo-type process if it were [106] present in the finished print?

“A. Thiourea is doubtless oxidized although probably in so small quantities that we cannot detect it.

“Q. You testified that in the reducing action the reducing agent is oxidized.

“A. I did.

“Q. Does thiourea absorb oxygen?

“A. It does not, at least not under normal circumstances.

(Testimony of Frans Van der Grinten.)

“Q. You repeatedly referred to the action of thiourea upon cupric chloride and have referred to a publication published in 1884 by Rathke; when was the first time you saw that publication Doctor?

“A. I don’t remember.

“Q. Was it before or after you had finished at the University at Munich?

“A. I think it was after.

“Q. When you started to work at your father’s establishment at Venlo?

“A. I don’t know that any more.

“Q. Does the publication in *Berichte* by Rathke in 1884 mention anything about reducing agents? Is the word “reducing agent” mentioned in that publication?

“A. I don’t know.

“Q. Does Rathke describe a reduction process in that publication?

“A. He certainly does.

“Q. In so many words?

“A. In very many words and in very clear words.

“Q. The words ‘reduction process’ and ‘reduction agents’ are mentioned?

“A. I don’t know whether the words ‘reduction agent’ appear in that paper, but I know that Rathke says thiourea takes off [107] one of the atoms of chlorine of cupric chloride and this forms cuprous chloride. Any chemist in the world will say this is a reduction. It is in no way necessary that Rathke in

(Testimony of Frans Van der Grinten.)

that article use the word 'reduction'. As I said yesterday, the taking off of chlorine is the same as saying a reduction action is going on.

"Q. The first sentence in this publication by Rathke, which is Plaintiffs' Exhibit 10, is as follows:

"The subject matter of this paper relates to some combinations of thiourea with inorganic salts which are of particular interest because from them it may be shown that they do no longer contain this salt as such, but that the metal has entered the urea complex, and that the latter one then has combined with the acid." Will you look at that sentence and tell me whether or not the paper in any way relates to the reduction of cupric oxide, or any metal salt, or any copper salt by thiourea?

"A. It certainly does. In these lines which you have been reading—yes, even the lines you have been reading as follows, which I see here; the pages as quoted by me, page 2 of the translation, doubtless refers to the reducing of cupric chloride to cuprous chloride.

"Q. Will you turn to page 3, the sentence commencing 'The remainder of the thiourea in the filtrate was then decomposed by an ammoniacal silver solution, the silver sulfide collected upon a weighed filter and freed from silver chloride by careful washing with ammonia,' etc. If thiourea were a reducing agent would we not have metallic silver there rather than a silver sulfide?

(Testimony of Frans Van der Grinten.)

“A. No, sir, we would not.

“Q. Will you explain your answer?

“A. When you have hydrogen sulfide and ammoniacal silver solution you will get a silver sulfide exactly as you get it in this way, which does not prove at all that hydrogen sulfide, [108] one of the most well-known reducing agents, is no reducing agent. The only thing you then observe is that there was a complication in the reaction which makes it impossible for the reducing agent to bring about this action. No chemist will say that hydrogen sulfide is not a reducing agent; still, hydrogen sulfide does not depose any metallic silver out of an ammoniacal silver solution.

“Q. Have you ever seen in any other literature in any place, in any hand-books of organic chemistry, any statement that thiourea was a reducing agent.

“A. Oh, yes. I have very often seen it not only in handbooks but in publications that thiourea acted in a reducing manner.

“Q. Are you familiar with the publication of Beilstein on Organic and Inorganic Chemistry?

“A. You will excuse me, please, for not knowing what you mean by the word ‘familiar.’

“Q. Do you know whether or not it is an international authority on chemistry?

“A. The Beilstein Hand-book is a book which collects all kinds of details about organic chemical

(Testimony of Frans Van der Grinten.)

substances, but whether Beilstein is an international authority or not, I do not know.

“Q. Does thiourea reduce ammoniacal silver nitrate solution?

“A. As I have already said, in this reaction a complication is involved because silver sulfide is formed; the silver being already transmitted to the silver sulfide it cannot be any more reduced, because the silver sulfide forms an insoluble deposit and thus can be no more acted upon by the thiourea.

“Q. Does thiourea reduce mercuric chloride solution?

“A. It certainly does.

“Q. Does it reduce chromic chloride solution? [109]

“A. It does not. That does not mean that it is not a reducing agent. If only substances capable of reducing chromic chloride would have to be considered as a reducing agent, I might say that only nascent hydrogen could be considered as a reducing agent.

“Q. Glucose will reduce this substance I have just mentioned, will it not?

“A. I don't know whether it will reduce chromic chloride solution, or not; I am in doubt about that.

“Q. It will reduce mercuric chloride solution?

“A. It will reduce mercuric chloride solution.

“Q. How about tartaric acid and citric acid, or the salts thereof, will they reduce this substance?

(Testimony of Frans Van der Grinten.)

“A. Yes, certainly they will, because there are no complications.

“Q. You are not sure about thiourea reducing ammoniacal silver nitrate?

“A. I certainly am; that has nothing to do with the reducing properties of thiourea.

“Q. How about formaldehyde?

“A. It will reduce, as far as I know, ammoniacal silver solution.

“Q. In other words, practically every reducing agent you can think of with the exception of thiourea will reduce ammoniacal silver nitrate: Is that right?

“A. No. Hydrogen sulfide one of the most excellent reducing agents which we have, does not reduce ammoniacal silver solution; consequently, thiourea in not reducing ammoniacal silver solution is in very good company.

“Q. Hydrogen sulfide, is that the reducing agent you mention?

“A. That is a very strong reducing agent.

“Q. That is an inorganic reducing agent?

“A. Yes. [110]

“Q. And glucose and citric acid are all organic reducing agents, are they not?

“A. Yes, they are.

“Q. Now referring to the first patent in suit, 1,821,281, page 2, line 56, starting ‘The invention is based on the observation,’ etc., you have that paragraph before you there; will you kindly state to

(Testimony of Frans Van der Grinten.)

the Court whether or not all reducing agent, if added to a sensitive diazo layer, or during or after development of the picture, will arrest discoloration of the background?

“A. I cannot give a direct answer to this, because I do not know. I have never been given the opportunity to test all reducing agents, of which there are certainly thousands, and I have not been able to test certain reducing agents on all the possible combinations of diazo type and azodyestuff components which may constitute the finished print in which we have to arrest the discoloration. The only thing which I know and have found is that the reducing agents in acting on the discolorations act very specifically, which means that one reducing agent may be very strongly arresting the discoloration in one particular case and not so good in another combination. For instance, thiourea is a very good reducing agent when used in combination with certain diazo type azodyestuff components whilst it does not work very well when other such combinations are used. On the contrary, another reducing agent, like glucose should work in the first-named combination and practically not in the second combination very well. It is consequently perfectly impossible to say whether a reducing agent is not active in arresting discoloration as long as one has not had the opportunity to test whether such a reducing agent prevents a discoloration in all kinds of possible combination of diazo and azo components.

(Testimony of Frans Van der Grinten.)

“Q. Will you turn to page 5 of your patent and refer to the first claim in suit, claim No. 1; please define the reducing [111] agent which is specified in that process.

“A. In this claim is not specified a specific reducing agent.

“Q. What are the elements of the process?

“A. The elements of the process are that to the finished print there is added in any stage of its manufacture a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said print.

“Q. What is that reducing agent?

“A. That is not one reducing agent.

“Q. How would you practice the process of that claim?

“A. I would practice it in taking a reducing agent and trying whether under the circumstances I am working under it gives the result which I want.

“Q. In other words, if you get the result you have practiced the process: Is that it?

“A. No, that is not what I said in other words.

“Q. How would you practice the process?

“A. As I have already told you.

“Q. Is that not the same thing as saying that if you get the result then you have practiced the process?

(Testimony of Frans Van der Grinten.)

“A. No sir, it is not, particularly so because when I read a patent—at least when I do it as a scientist I not only read the claim of the patent, but I read the description and I find that the description of the patent gives me certain directions, prefers reducing agents, etc. It gives certain examples, certain particular individual or chemical substances, and so on, etc., and tells me how to read and practice the first claim of the patent.

“Q. You say on page 2 that preferred reducing agents are organic substances as aldehydes. Do the aldehydes arrest the discoloration of the background on a finished diazo print?

“A. I cannot answer that question. I could only give you the [112] same answer I have already given, that in order to know that I would have to try out all of the possible combinations on diazo and azo components, the discoloration of which I have to arrest. Only then I could give you an answer and say will or will not.

“Q. That would be rather an exhaustive and painstaking experiment, would it not?

“A. I think it would take a man's life, at least, and even then he would not be finished.

“Q. How about amino compounds, do all amino compounds arrest the discoloration of the background?

“A. I can only give you the same answer on that.

“Q. Do all reducing amino compounds arrest the discoloration?

“A. I will give you the same answer that I have given you before.

(Testimony of Frans Van der Grinten.)

“Q. Then again if you get the result, if you get a print in which the background does not discolor for an appreciable period by using certain ingredients, then you have practiced the process, but if you do not get that result with an amino compound, or with an aldehyde, or a reducing polyoxy compound, if you do not get that result then you have not practiced the process of claim 1?

“A. That may be, although I am not here as an expert to explain the scope of the patent and how that has to be.

“Q. I am not asking you that. I am asking you how you practice the process.

“A. Excuse me, I thought you asked me that. I think your question comes very close to asking me that.

“Q. When the diazo sensitive layers and developers are put out on the market they are put out under directions how to use them to manufacture a diazo type?

“A. Yes, I think they mostly are; of course, that depends upon the firm which puts them on the market. [113]

“Q. Then anyone who has been selling and manufacturing diazo types, say for a period of a year or two years, would be a person skilled in the art of manufacturing diazo types, would he not?

“A. From a certain point of view, yes, he would be skilled to use manufactured papers and manufactured developers in the right way.

(Testimony of Frans Van der Grinten.)

“Q. That is what I say. He would be skilled in the art of manufacturing diazo types from diazo layers and developers therefor which have been put on the market and which he has purchased and used?

“A. I think so, yes.

“Q. Assuming for the moment that the diazo layer which is furnished to him and the developer therefor, which is furnished to him, do not contain any reducing agent whatsoever, how would that person who is skilled in the art practice the process of claim 1 by introducing a reducing agent capable of arresting the discoloration of the components of the background, what would he do to practice that process?

“A. I think this man could not be considered skilled enough to practice that process.

“Q. You are familiar with the blue line or the blue printing process are you not, Doctor?

“A. Yes.

“Q. You were speaking on your direct examination of the fixation of exposed prints.

“A. Yes, I was.

“Q. Would you say that men who have been engaged in the blue-printing industry are skilled in the art of blueprinting and are experienced in fixing the exposed prints with certain substances or certain chemicals?

“A. Only in this respect, that such a man can make a blueprint [114] when a good blueprint paper is marketed and sold to him. There must be a dif-

(Testimony of Frans Van der Grinten.)

ference between a process from the whole chemical point of view and a process which is carried out only in part and certain manipulations by those skilled in handling and operating these different phases of the process.

“Q. In the blueprinting process, to fix the print the blueprinter uses a water bath and a bath of hypo, so-called, also known as a bath of sodium thiosulfate.

“A. I never heard of any hyposulphites or sodium thiosulfate being used in fixing a blueprint.

“Q. Assuming for the moment that a blueprinter did use sodium thiosulfate in the blueprinting industry to fix or to stabilize or to arrest the discoloration of the background of the blueprint, would it occur to him to use hypo or sodium thiosulfate to arrest the discoloration of a diazo print if it so happened that it did discolor it?

“A. I don't think it would occur to him at all.

“Q. You say you have never heard of them using hypo or sodium thiosulfate in connection with a blueprint?

“A. No, I honestly must say I never heard of it.

“Q. Are you acquainted with the so-called brown line process, manufacturing brown line prints?

“A. I don't know what you understand by brown line prints in this country.

“Q. What do you understand to be brown line prints in your own country?

“A. We do not use that name.

(Testimony of Frans Van der Grinten.)

“Q. Referring again to the so-called brown line process, are you familiar with the so-called negative or Van Dyke process, also known as the sepia process, or silver process.

“A. The sepia process is known to me.

“Q. In the sepia process, in order to fix the background of the [115] finished print, do you use hypo?

“A. We certainly do, like we do for fixing photographic negatives.

“Q. How long have you used hypo in that sepia process?

“A. I think in the sepia process, as well as in the normal photographic negative process—

Mr. HOFFMAN: Just a moment. I object, your Honor, to this line of questions. We have not testified about this process in our direct. It really is not pertinent to the diazo type art. It is just as distinct as the photostat art and the blueprint art.

The COURT: Objection overruled; exception.

“Q. Hypo, so-called, as you have previously testified, is also known as sodium thiosulfate?

“A. It is.

“Q. And that is a reducing agent, itself?

“A. It is.

“Q. An inorganic reducing agent?

“A. An inorganic reducing agent.

“Q. Do you know whether or not the sepia process has been practiced in the United States for a period of time?

(Testimony of Frans Van der Grinten.)

“A. I may assume that it has been used in this country for many, many years.

“Q. And the diazo type process is practiced in the same industry as the sepia process, is it not?

“A. I think it mostly will be.

“Q. So that a workman practicing the diazo type process alongside of the sepia process, and obtaining prints from the diazo type process which discolor, would naturally use hypo to prevent the discoloration on the background of diazo types?

“A. I can only say this, that on account of the immense chemical difference between the one and the other process the sepia [116] process, working with silver salts from which by the action of light silver is formed so as to obtain a negative print, the diazo type art working with diazo compounds, substances of quite different nature—I would like to repeat that on account of this difference in the chemical working of these two processes the workman applying thiosulfate to a diazo type print and finding that thiosulfate arrests discoloration of the diazo type print would make a 100 per cent invention.

“Q. The two processes are practiced side by side in the same industry, are they not?

“A. They may be.

“Q. And a workman having in his plant a bath of hypo which he uses to arrest the discoloration of the sepia prints would naturally use the same substance—hypo—to prevent the discoloration of the

(Testimony of Frans Van der Grinten.)

background of the diazo prints if it so happened that the diazo prints did discolor?

“A. I think that out of 10,000 workmen not one would come to that idea. If a workman did so and found that thiosulfate was capable of arresting the discoloration on a diazo type print, he would make a very great discovery, and would make a patentable invention.

“Q. That is merely your conclusion, is it not?

The COURT: He is stating it as his conclusion.

“A. It is not my conclusion, it is my opinion.

“Q. Will you turn to claim 3 of the first patent in suit, which is on page 5 of the patent, and state to the court the elements of the process defined in claim 3?

“A. This claim calls for including in a diazo type print a reducing aliphatic compound capable of arresting, under normal conditions, the discoloration of components formed on the background of said print.

“Q. That is, there is merely one step there, merely the [117] addition of this reducing aliphatic compound capable of arresting the discoloration under normal conditions of components formed on the background of the print?

“A. This is one step which however as I have explained on the chart, Plaintiffs' Exhibit 8, can be done in different ways.

“Q. Yes, I understand that, Doctor. What is a reducing aliphatic compound capable of arresting

(Testimony of Frans Van der Grinten.)

under normal conditions the components of the background of a diazo type print?

“A. It is an organic compound, not of an aromatic nature, that is to say, not of the nature of benzene or pyridine, or the derivatives of such substances which has reducing properties and which is capable of arresting the discoloration.

“Q. You are defining it in the terms of the effect, that is to say, what it may produce; can you not define a reducing aliphatic compound capable of arresting discoloration in any other way?

“A. I can only give a definition of such a reducing aliphatic compound by saying what I have said, that it must be an aliphatic compound, that is, an organic non-aromatic compound, and capable of arresting discoloration.

“Q. How many reducing aliphatic compounds are known to chemists?

“A. I could not possibly say that, but I think it must be many, many thousands.

“Q. Then in order to practice this process one would have to pick and choose, so to speak, from countless reducing aliphatic compounds and try it out under exhaustive experiments and if he got this result of arresting discoloration of the background then he would be practicing this process: Is that correct?

“A. That would be correct if the man who intended to carry out the process only was given the opportunity to read the third claim, but he has

(Testimony of Frans Van der Grinten.)

an opportunity to read the whole patent, to read the description and the examples which give [118] indications and by which he might obtain the result quicker.

“Q. All reducing aliphatic compounds are not capable of arresting discoloration of the background on a diazo type print are they?

“A. As I told you already, nobody can know that, because nobody can be in a position to have tested all reducing aliphatic compounds in all different combinations on diazo type prints.

“Q. Will you turn to page 4. Under Example 1 is there any statement there between lines 29 to 46, inclusive, relative to reducing agents, whatsoever? Is the word ‘reducing agent’ used in that paragraph?

“A. In this example a chemical compound, namely formaldehyde, is added to the bath and consequently added to the finished print.

“Q. I didn’t ask you that, Doctor. I asked you whether the term “reducing agent” was used in that paragraph.

“A. No.

“Q. Then anyone who had been practicing this process for two or three years, or for four years with diazo-type paper and the developer would not know by referring to the examples set out on page 4 what ingredient or what substance set out in that example was a reducing aliphatic compound from the specification, itself, would he.

(Testimony of Frans Van der Grinten.)

“A. He would, of course, when he would read my first example. That teaches him to use formaldehyde. He turns back to page 2, lines 62 and following, and he will read there that preferred reducing agents are, for instance, aldehydes. Consequently, when he reads formaldehyde has to be used according to the first example he must see that this formaldehyde is added as an aldehyde, and consequently as a reducing agent within the meaning of the patent.

“Q. Take that first example on page 4, commencing with line 37: [119] ‘After exposure under a transparent original the paper is developed in a feebly alkaline solution of B-oxynaphthoic acid anilide to which 0.4 per cent. of formaldehyde has been added.’ Then it goes on to say: ‘There is obtained a positive brown-violet image on a white ground which does not become yellow on keeping. Preferably, it is afterwards washed in a solution of formaldehyde of 0.4 per cent. strength.’ In connection with Claim 3 will you please state to the Court whether the process defined in that claim calls for the second addition of formaldehyde?

“A. It certainly does.

“Q. You have previously stated, have you not, that Claim 3 calls for the step of introducing an ingredient into the finished prints?

“A. I certainly did.

“Q. An ingredient capable of arresting discoloration?

(Testimony of Frans Van der Grinten.)

“A. Yes.

“Q. And in the example you introduced 0.4 per cent. of formaldehyde and then you said that preferably it is afterwards washed in a solution of formaldehyde of 0.4 per cent. strength. Does Claim 3 call for that same thing?

“A. It certainly does.

“Q. How do you explain that?

“A. I explain that because formaldehyde is a substance which can very easily be absorbed by the paper, by the fiber and other substances in the paper, so that upon washing, especially upon washing with a solution which again contains formaldehyde, the formaldehyde applied in the developing bath is not taken out, but there is still more formaldehyde added to the print, whilst on the other hand certain substances which cause a discoloration are partly, as I have explained in connection with Exhibit No. 7, on the left-hand part, washed out. So we have the advantage of the old method that we take the substances partly out [120] and at the same time the advantage of adding a reducing agent of the type of an aliphatic compound to the finished print.

“Q. Referring again to Example 1, will you please state how many reducing agents or substances are mentioned in that example.

“A. In this example there is mentioned one reducing agent, formaldehyde.

“Q. You have mentioned an azodyestuff component in that example, have you not?

(Testimony of Frans Van der Grinten.)

“A. Yes.

“Q. Will you please state to the Court what that substance is?

“A. The substance which plays the role of the azodyestuff component in Example 1 is B-oxynaphthoic acid anilide.

“Q. Is that substance a reducing compound?

“A. It certainly is.

“Q. What type of reducing compound is it and in what class does it fall? Does it fall in the class of an amino or does it fall in the class of an aldehyde?

“A. It does not fall under any class of reducing agent mentioned in this patent because it does not prevent discoloration, but will cause it.

“Q. I did not ask you that, Doctor. I asked you whether it was an amino or an aldehyde or a poly-oxy compound.

“A. I have already answered that.

“Q. On page 2 of this patent, line 62, you say: ‘Preferred reducing agents are organic substances such as aldehydes.’ Does the azodyestuff component mentioned in Example 1 fall in the class of a reducing aldehyde?

“A. No, it does not.

“Q. Does it fall in the class of a reducing amino compound?

“A. It may.

“Q. But it is not a reducing amino compound which is capable of [121] arresting the discolora-

(Testimony of Frans Van der Grinten.)

tion of the background of the finished diazo type print?

“A. I may even say——

“Q. Answer that ‘Yes’ or ‘No’, Doctor, and then explain.

“A. Yes.

“Q. It may arrest the discoloration of the background of the finished print?

“A. No, because it is a substance which causes its discoloration.

“Q. That is correct. Now, turn to Claim 4 of the patent in suit: What are the elements of that claim?

“A. This claim calls for the introduction of a reducing amino compound capable of arresting the discoloration of diazo-type prints.

“Q. It is one step, merely the addition of an ingredient to the print, in one of more ways: Is that right?

“A. One step which can be carried out in different ways, as explained in connection with Exhibit 8.

“Q. How many reducing amino compounds are known to chemists?

“A. Many.

“Q. Countless.

“A. Not countless.

“Q. Approximately how many?

“A. I cannot estimate it at all. In chemistry practically any sort of a compound can exist more

(Testimony of Frans Van der Grinten.)

or less in a limitless number. One can never know how many there are.

“Q. And in order to practice the process of Claim 4 you would have to perform exhaustive experiments to determine whether or not you had a reducing amino compound which is capable of arresting the discoloration of components formed on the background of the print?

“A. I do not think you would have to make such exhaustive [122] tests or investigations along that line, especially for the reason that the patent, on page 2, lines 62 and following, says: ‘Preferred reducing agents are organic substances such as aldehydes, amino compounds, aliphatic amido-compounds, polyoxy compounds, or the like.’

“Q. So does claim 4. How are you going to practice the process? What reducing amino compound are you going to use?

“A. You use reducing amino compounds which you most easily can get on the market. For instance, thiourea is one of the amino compounds which is easiest to be obtained on the market.

“Q. But you would not know whether you practice that process or not until you apply it and find out whether or not the finished print did discolor. You would not know until you had actually practiced the process and until you had seen the result?

“A. Oh, yes, you would know.

“Q. How would you know?

“A. You could determine it by applying this substance to the print and if it arrested the dis-

(Testimony of Frans Van der Grinten.)

coloration you could try it out on all possible combinations of diazo compounds and azo coupling components. For instance, if you are trying out thio-urea and you find a combination on which it does not act you thereafter find a combination on which it acts very well.

“Q. The reducing amino compound is defined in terms of the effect or the result which may be produced on a finished diazo print: Is that not correct—in Claim 4?

“A. In Claim 4 it is stated that the reducing amino compound must be capable of arresting under normal conditions the discoloration.

“Q. But it is not defined specifically, is it, other than what its effect on a certain diazo type print is?

“A. You will agree that in the very numerous chemical compounds which we know, reducing compounds and reducing amino [123] compounds, it is of course absolutely impossible to indicate in a patent all the substances.

“Q. With respect to claims 7, 8, 16 and 25, all of which are process claims, will you state whether or not the reducing agents called for in those claims are specifically defined?

“A. They are specifically defined.

“Q. How are they defined?

“A. They are defined in claim 7 as reducing agents, in claim 8 as reducing amino compounds, in claim 16 as reducing agents, and in claim 25 as reducing agents.

(Testimony of Frans Van der Grinten.)

“Q. With a qualifying clause, only reducing agents which are capable of arresting the discoloration of the diazo background?

“A. Yes, this clause is absolutely necessary all the time. You referred in one of your earlier questions to the fact whether B-oxynaphthoic acid anilide was a reducing agent or not; it is of course absolutely understood that these substances in the background which cause a discoloration must be reducing agents, themselves, they must be oxidizable substances, otherwise they could not cause the discoloration. Consequently it is understood that these substances must be excepted from the substances we have just referred to.

“Q. But you don't know whether you are practicing the processes of these claims until you actually inspect the finished diazo print, do you?

“A. That may be, but that does not make any difference because it is impossible to say whether a reducing agent will act on such and such a combination.

“Q. Just answer the question ‘Yes’ or ‘No’, if you please, Doctor. In claims 40 and 41, which are product claims, will you first state what the product is which is defined in those claims?

“A. Claim 40 calls for a light-sensitive diazo-type layer [124] containing a diazo compound bleaching on exposure to light and a bleaching agent capable of arresting under normal conditions the discoloration of the components formed on the background of the finished print.

(Testimony of Frans Van der Grinten.)

“Q. Did you mention claim 41?

“A. Claim 41 calls for the same product as claim 40, with the difference that here the reducing agent is a reducing amino compound.

“Q. A product ordinarily in your mind is a combination of elements, is it not, Doctor?

“A. Not always.

“Q. The elements are clearly defined in any product, are they not?

“A. Sometimes they are and sometimes they are not.

“Q. In the product claims 40 and 41 you have two elements, a base having a diazo compound in it and a reducing agent capable of arresting discoloration. That second element is defined solely in terms of the effect or the result which may be obtained in developing a diazo layer, is it not?

“A. It is not in any way solely defined in that way. In the definition it is said that it must be a reducing agent, which is a common substance that is very well defined.

“Q. How would you manufacture a product described in claim 40?

“A. I would make a diazo type layer containing a diazo compound bleaching upon exposure to light and add to such layer a reducing agent, as described in the claim.

“Q. Do all diazo compounds bleach upon exposure to light?

“A. No.

(Testimony of Frans Van der Grinten.)

“Q. Which diazo compound would you use in making this product?

“A. I would use one which bleached upon exposure to light.

“Q. An actual manufacturer, when you first apply this to a compound or a layer or a base, how would he know whether he was put- [125] ting on there a diazo compound which is going to bleach upon exposure to light?

“A. He would find that out by test.

“Q. By experiment?

“A. By experiment.

“Q. How do you know when you are adding a reducing agent to that layer that you are putting on a reducing agent which is going to arrest the discoloration of the background of any finished print made from that layer?

“A. By experiment, and by referring to the description and the examples in the patent.

“Q. In Plaintiffs' Exhibit No. 7, you have previously testified that the right-hand portion of the chart indicates a process which is old, that is, prior to your invention: Is that correct?

“A. That is correct.

“Q. Does it by any chance refer to the process practiced by the Kalle & Company people in Germany?

“A. I have already stated that this process is the one which is described in British patent 210,862.

“Q. That is Plaintiffs' Exhibit 20, is it not?

“A. It is.

(Testimony of Frans Van der Grinten.)

“Q. Do you recall what the acid is which is used in the light-sensitive coating or light-sensitive layer?

“A. In this patent, as far as I remember, there is suggested to add to this layer for the purpose of preventing the formation of the azo dyestuff out of two components present in the layer an acid, for instance, tartaric acid or citric acid.

“Q. And that is set forth in British patent 210,862, Plaintiffs' Exhibit 20, at page 3, lines 38 and 39, is it not?

“A. It is stated on page 1, lines 80 to 83, as follows: ‘To obtain still greater stability of the light-sensitive layer small additions of acid such as tartaric or citric acid are made.’ [126]

“Q. In your direct testimony yesterday you stated, Doctor, when discussing the right-hand portion of this chart, Plaintiffs' Exhibit 7, that the acid which has been changed into a salt from the acid remaining remains in this white background on the print: Is that your testimony?

“A. The acid added to the light-sensitive layer is by the action of the alkali upon the development changed into a salt of such acid.

“Q. Such as sodium tartrate, if tartaric acid were used?

“A. Yes.

“Q. Or sodium citrate, if citric acid has been used?

(Testimony of Frans Van der Grinten.)

“A. Yes, if it has been used in the sensitive layer.

“Q. That would remain in the finished print?

“A. And this substance will remain in the finished print.

“Q. I refer you now, Doctor, to the second patent in suit, 1,841,653, page 3, under Example 2, lines 45 to 54, and ask you whether or not it is not stated there that sodium citrate is added and an entirely black picture is obtained which is very stable against any tendency to become yellow, which would not be the case without the reducing means, citrate, hyposulphite, and glucose.

“A. That is correct.

“Q. As a matter of fact, in the old process here as shown on Plaintiffs' Exhibit No. 7 sodium citrate remains in the finished print, does it not?

“A. It does.

“Q. And as you stated, sodium citrate is a reducing agent, and it is capable of preventing discoloration in the background of the finished print?

“A. It is stated in the second patent in suit with specific reference to the example in which this is said that an amount of 10 per cent. of sodium citrate is capable of counteracting the discoloration because the sodium citrate is a reducing [127] agent. Furthermore, this example states that 10 per cent. of sodium hyposulphite and 10 per cent. of glucose, both reducing agents, have to be added, and that with this 30 per cent. of substances the discolora-

(Testimony of Frans Van der Grinten.)

tion is prevented. Consequently, in the particular connection in which this is said in this patent it means that a sufficient amount of reducing agent, like citrate, can arrest the discoloration. In the Kalle process, as mentioned by you, there is used an amount of only $\frac{1}{2}$ per cent. of citric or tartaric acid.

“Q. Where you do find that, Doctor?

“A. I quote from Plaintiffs' Exhibit 20, page 1, lines 80 to 83, where it is said, ‘Small additions of acid such as tartaric acid or citric acid are made.’ And furthermore, I refer to Example 3, which adds to 1000 parts of water 5 parts of tartaric acid; that would be $\frac{1}{2}$ of 1 per cent.

“Q. When was this patent published, Doctor?

“A. That I cannot say right now. I know when it was completed.

“Q. When was it completed?

“A. It was completely exhibited on February 7, 1924.

“Q. It was completely exhibited on that date?

“A. It was completely exhibited on February 7, 1924.

“Q. Which was more than two years prior to your application which was originally filed in The Netherlands: Is that not correct?

“A. That is correct.

“Q. Is it your testimony that it requires an appreciable amount of reducing agent in the finished print to produce an arrest of discoloration of the

(Testimony of Frans Van der Grinten.)

components forming the background of that print?

“A. Yes, of course.

“Q. You do not find that in your specification of either patent in suit, do you, Doctor?

“A. We certainly do, because in our examples we give certain amounts which indicate the amounts which they have used to [128] obtain the results.

“Q. In Example 1 on page 4 of the first patent you specify 0.4 of 1 per cent. of formaldehyde; is that an appreciable amount of reducing agent?

“A. In connection with the process described in this example it is indeed an appreciable amount, because the print, here, is bathed and left in contact with the solution for a long time, so that the formaldehyde has plenty opportunity to enter into the paper the discoloration of which has to be prevented. It says there that after exposure under a transparent original the paper is developed in a feeble alkaline solution.

“Q. It says nothing about a bath, does it?

“A. How could you develop a print in a weak alkaline solution without bathing it in such a solution?

“Q. Can you not develop it with ammonia fumes, a weak alkaline solution?

“A. Then I don't develop it with a weak alkaline solution, do I?

“Q. But it says nothing about a bath.

“A. It is not necessary that a man is submerged in a bath when you say he falls into the water, is it? Do you have to say that?

(Testimony of Frans Van der Grinten.)

“Q. At all events, Doctor, you have in the finished print of the old process as described or indicated on the right-hand side of Plaintiffs’ Exhibit 7, you have in that print sodium citrate or sodium tartrate?

“A. We have a very small amount of sodium citrate or sodium tartrate in that print.

“Q. And that is a reducing agent which is capable of arresting the discoloration of the components forming the background of a diazo print?

“A. Yes, it is, and not in amounts as indicated in the Kalle [129] patent which you have mentioned, which is prior to the first patent in suit. I have tested this myself several times and I never could find out this amount of citrates or tartrates did in any way arresting discoloration to an appreciable extent.

“Q. Can you produce the result of those tests? Have you any finished prints of that character here in court?

“A. I don’t know whether I have them. I don’t think I have them in court; maybe I have them in my baggage.

Mr. HOFFMAN: If your Honor please, I would like to make a statement at this time before we resume the cross-examination. Before we put on our next witness we propose to enter into a stipulation whereby the defendant agrees or, rather, it concedes that its sensitized paper contains a diazo

(Testimony of Frans Van der Grinten.)

compound bleaching on exposure to light, and that its developer contains an azo-coupling component and a non-volatile alkaline substance. When this stipulation is entered into it will simmer down the issues as regards the infringement of the first patent in suit to whether defendant's paper contains a reducing agent of the type which acts to arrest the discoloration of the background of the finished print, and also whether its developer contains a reducing agent which acts to prevent the discoloration of the white background of the finished print. When we will put our next witness on the stand——

The COURT: Let me interrupt you to ask here, because I am still rather in the dark in this case, is that the question that is involved in the case?

Mr. HOFFMAN: Whether there is a reducing agent in the finished print, in the background of the finished print, which acts to arrest this discoloration.

The COURT: That is the point. Has the defendant a patent on its device or its process?

Mr. HOFFMAN: No, your Honor. [130]

The COURT: There is still the question whether there is infringement. Your process arrests the discoloration, does it?

Mr. WHITE: We do not admit that, your Honor.

Mr. HOFFMAN: If your Honor will permit me I will continue with my statement and I think you will get a little clearer view of the situation.

The COURT: Very well.

(Testimony of Frans Van der Grinten.)

Mr. HOFFMAN: When we put our next witness on the stand, what we propose to show by his testimony is that we have analyzed the defendant's paper and have found thiourea in it; we have analyzed defendant's developer and have found thiosulfate in it. The issue will be in this case, the specific issue in the case will be whether thiourea is a reducing agent and whether that thiourea when present in the background of the finished print, that is, in the white background, arrests that discoloration. The other issue will be whether thiosulfate, when present in the background of the finished print is a reducing agent, and whether when present in the background of the finished print it acts to arrest discoloration. Those will be the issues as regards the infringement of the first patent in suit.

Now, as to the second patent in suit, I would also like to make a statement at this time. The only issue regarding infringement as to the second patent will be the mode of applying the developing solution to the exposed surface of the print. You understand what we mean by the exposed print. You take the sensitized paper that has a sort of a yellow coating on it and then expose it under a tracing, for instance, this part here, and here we start here with the light-sensitive coating and then put this tracing on top of it. This represents the back image. This space represents the white or the transparent portion. When you place the tracing on top of this the light passes through here

(Testimony of Frans Van der Grinten.)

and passes through the transparent portion and attacks the cor- [131] responding portion of the sensitive layer underneath. Because of the black lines in the tracing the light cannot pass through there, and so that portion is not attacked by the light.

The COURT: It is preserved?

Mr. HOFFMAN: It is preserved. I showed you a print the other day, and the exposed print was that part which showed the white background with a faint yellow image. That is what we are talking about when we refer to the exposed print. The issue on the second patent as regards the infringement is as to the mode of application of this developer solution to this exposed surface in order to make that black color.

The COURT: To turn the yellow to black?

Mr. HOFFMAN: Yes, that is right, your Honor. That will be the issue.

The COURT: You turn it to black and then after that there is the process that arrests discoloration?

Mr. HOFFMAN: Yes. After the print is made and you leave it on your desk, or you put it in a filing cabinet, or in your desk drawer—these prints are kept wherever you want them to use for reference purposes. During that period of time they show a discoloration in the white background. When they are freshly made, that is, after you have just applied the developer, they are perfectly white and they stay white. If they do not have the reducing agent in there, the invention of the first patent, they show the discoloration in probably two weeks or a month.

(Testimony of Frans Van der Grinten.)

In many instances it is a very marked discoloration. I think that with that statement your Honor will have a clear idea in your mind as to what the issues will be in this case as regards infringement.

The COURT: Your statement is helpful. Your opening statement was very helpful. Without it I would have been unable to understand the expert.

Mr. WHITE: I am in full accord with the statement made by [132] plaintiffs' counsel, only that I want to add that I am not waiving any of our rights in this case, or anything of that character.

The COURT: Of course not.

"Q. At the close of the morning session, Doctor, we were discussing the inclusion of sodium citrate in the finished product which resulted from practicing the process as defined in the Kalle British patent. Do you recall that testimony? You testified, did you not, that in your opinion the discoloration of the background would not be arrested in that case because of the insufficient or minute quantities of sodium citrate which would remain in the finished print.

"A. That is what I testified.

"Q. You have previously testified that thiourea in minute quantities was not only an anti-oxygen of Moureu but was also a reducing agent?

"A. I have, as far as I have been stating anything on that line, not spoken about any quantities; I have just told you that thiourea is a reducing agent and at the same time that thiourea can act as an anti-oxygen in the sense of Moureu.

(Testimony of Frans Van der Grinten.)

“Q. I am trying to get a distinction, Doctor, between an anti-oxygen of Moureu and a reducing agent.

“A. You may not get a distinction between those two for the simple reason that all anti-oxygens of Moureu are reducing agents.

“Q. Everyone of them?

“A. And all must be reducing agents under Moureu's own theory. If I had had an opportunity to give you the authoritative meaning of Moureu, himself, who invented these anti-oxygens I could have done it very quickly and I think it would have been extremely useful to have his own idea about this. He attributes the anti-oxygen properties of anti-oxygens to their reducing properties.

“Q. But only when used in minute quantities?

“A. It has nothing to do with the quantity. Never in chemistry [133] catalytic action has anything to do with the quantity used.

“Q. If thiourea were to be added at any stage of your process, whether in the layer, the developer, or in the finished print in very minute quantities, say the quantity of $\frac{1}{2}$ of 1 per cent., such as the sodium citrate would be in the finished print, would thiourea act to arrest the discoloration in the finished print?

“A. In these quantities thiourea would act just appreciably. It would act better when larger quantities were used.

“Q. The same holds true in the case of sodium citrate?

(Testimony of Frans Van der Grinten.)

“A. In the case of sodium citrate, the difference is much larger. The quantity used in the British Kalle patent mentioned by you does not show an arresting of the discoloration, which can be seen by anybody, and the patent, itself, does not say anything about it. A quantity of 10 to 20 times as much would cause a noticeable amelioration of the discoloration.

“Q. Would 10 to 20 or 30 times as much thiourea in the finished print arrest the discoloration to a more appreciable extent than the smaller quantity?

“A. It is likely that it would, although in practice this would be, of course, superfluous; in practice you can use only a limited quantity, because you cannot bring so many chemicals into a paper.

“Q. Before we leave this point of thiourea, I wish again to call your attention to Defendant's Exhibit A, the File Wrapper and contents of the German patent with this decision in regard to the issuance of that German patent to Kalle & Company, together with the translation thereof, and ask you whether or not at the time that proceeding was pending in the German Patent Office your United States application was not pending before the United States Patent Office?

“A. I do not remember. If you could give me the dates I could eventually tell you. [134]

“Q. I think that speaks for itself, Doctor, but we will just check it. Here is the translation of the German patent, and here is the first patent in suit.

(Testimony of Frans Van der Grinten.)

“A. The first patent in suit, the application date is June 6, 1927. The opposition proceeding was filed January 7, 1929. The patent was granted in 1931. It must have been at the same time, then.

“Q. They were both pending at the same time?

“A. Yes.

“Q. That is, the proceeding in the German Patent Office was pending at the time your application was pending in the United States Patent Office; that is shown by the dates, is it not?

“A. Yes.

“Q. Did you keep in touch with the prosecution of that application before the United States Patent Office? Were you in touch with your attorney during the prosecution of that application?

“A. Yes, we were.

“Q. Why is it, then, Doctor, that you were asserting in the German Patent Office that thiourea was a reducing aliphatic amino compound and also an anti-oxygen of Moureu, and at the same time you made no attempt to insert any of that data in your United States application?

“A. May I refer you to Mr. Hoffman, who was then my attorney——

M. HOFFMAN: I object to that, your Honor. That would go to new matter. We cannot insert new matter in an application. We must take the application as it is filed in the Patent Office, but we cannot add anything to it which is going to change the scope of it.

(Testimony of Frans Van der Grinten.)

The COURT: Objection overruled; exception.

"Q. I hand you Plaintiffs' Exhibit 3, being the certified [135] copy of the File Wrapper and Contents of the first patent, 1,821,281, and refer you to page 2 thereof, and ask you to read to the Court again the paragraph commencing "Preferred"?"

"A. 'Preferred reducing agents are organic substances such as aldehydes, amino compounds, aliphatic amido-compounds, polyoxy compounds, or the like, and the reducing agents are preferably used together with very small quantities,' etc.

"Q. In other words, that paragraph was inserted in the United States application at the initial stages of the application, that is, when it was filed, was it not?"

"A. I don't think so. I think it was in the original Dutch application.

"Q. Was thiourea specifically mentioned in the Dutch application?"

"A. No.

"Q. And you were asserting in the German Patent Office in 1930 while the application for the United States patent was pending, that thiourea was a reducing aliphatic amino compound, were you not?"

"A. Absolutely.

"Q. And you had a basis for inserting thiourea in the United States application when you said you preferred that the reducing agents were amino compounds; why did you not attempt to insert thiourea

(Testimony of Frans Van der Grinten.)

either in the specification or in the claims of the United States patent.

“A. You misunderstand me. I have not said we inserted it in the United States application. We just had the whole thing in the original Holland application. In the original Holland application we had exactly the same writing, preferred reducing agents are aldehydes, amino compounds, etc., etc. So we did not insert these here.

“Q. You gave certain examples in your United States application, specifically, on page 4, examples 1 to 5, examples of certain [136] substances which fall within these well-defined classes, reducing aldehydes, reducing amino compounds, did you not?

“A. We certainly did.

“Q. You did not give any example in which thiourea was used as one of the substances, did you?

“A. No, we did not.

“Q. At the same time you were asserting in the German Patent Office that thiourea was a reducing amino compound?

“A. I cannot see that there is any contradistinction in the attitude between the one and the other.

“Q. Before we leave this first patent, Doctor, I wish again to call your attention to the first claim of that patent, on page 5, and ask you again whether or not you are sure you have practiced the process before you examine the finished prints.

“A. You are not sure. May I change that and say you are not always sure.

(Testimony of Frans Van der Grinten.)

“Q. You do not know what specific reducing agent to use, do you?

“A. I do not know when I only read the claim, but I do know when I read the whole patent.

“Q. Assuming for the moment you did not have any formaldehyde as specified in Example 1, urotropin as in example 3, or any of the substances which are specified in the examples, assuming you had none of those substances available to you in your laboratory, what specific substance as a reducing agent would you use?

“A. I am not prepared to assume that.

“Q. And, furthermore, what quantity of that reducing agent would you use?

“A. I would use quantities equivalent to the quantities which are indicated in the examples in the description of the patent.

“Q. Is there any characteristic of reducing agents in general, common to all of them, that would lead you to believe that the [137] same quantity of formaldehyde, for example, could be used as the same quantity of thiourea?

“A. No, of course not.

“Q. You would have to experiment in order to find the specific quantity which you would need in order to get a finished print which did not discolor: Is that not correct?

“A. No, because you could take one of the examples and act after one of the examples; you would not have to experiment for one second, you

(Testimony of Frans Van der Grinten.)

would do as the example requested. If you wanted to use something then and used other reducing agents than those mentioned in the patent—and you must not forget that it is impossible to mention all of the reducing agents that could be used for this purpose, because if you did that you would have a book instead of a patent—then you would get a normal result. If you want to take others you would have to experiment. That is the case with any chemical patent in the world.

“Q. You previously testified that the claims in the United States patent are expressed in the only possible way that they could be expressed; do you recall that testimony?

“A. I think I have not given that testimony. Perhaps in the only practical possible way, I said. A man never can say, ‘This is the only way.’

“Q. The United States patent is based on the three Holland applications, one of which is a patent issued on an application filed February 10, 1927, that application being now in evidence as Plaintiffs’ Exhibit No. 14. I would like to have you refer to the claim in that patent and read it to the Court.

“A. ‘A process for making diazo types which do not or only slightly turn yellow, being characterized in that to the light-sensitive layers usually utilized therefor, or to the alkaline developing baths reducing agents, preferably organic compounds [138] such as aldehydes, amido-compounds, polyoxy compounds, carboxylic acid salts, or the catalytic acting anti-oxygens of Moureu known from the bibliography, are added.’

(Testimony of Frans Van der Grinten.)

“Q. You do not find in that claim the clause, ‘capable of arresting the discoloration of the components formed on the background of the diazo type prints,’ do you?

“A. No, you do not.

“Q. In other words, you can express your invention other than as specified in the United States applications?

“A. In this connection I must make this remark, that there are not two countries in the world in which the patent practice is the same. When I can express a claim in certain wording in Holland I cannot do it in the same wording in Germany, and I have to use other wording in England. So it is not only a difference in the language, but it is a difference in the practice of the patent offices.

“Q. Referring again to the claim in the Dutch patent, the claim which you have just read, as a matter of fact all reducing aldehydes, amino compounds, polyoxy compounds will not arrest discoloration of the background of the finished print, will they?

“A. I do not know that, and you don’t know it, and nobody can know it except when he has tested these on all possible combinations of diazo compounds and azodyestuff compounds.

“Q. I notice that all of the Holland patents were issued in the name of Frans Van der Grinten: Is that yourself?

“A. Frans Van der Grinten is my father.

(Testimony of Frans Van der Grinten.)

“Q. He is not the inventor of these processes?

“A. My father was the owner of the firm in which the inventors were engaged.

“Q. So the true inventors of the process are expressed or stated in the United States applications as required by the United States Patent Laws?

[139]

“A. Yes.

“Q. And your father had a consent to file these applications in Holland?

“A. Yes, he had.

“Q. Is that how it happens they are issued in the name of Frans Van der Grinten?

“A. That is right.

“Q. Now we will turn to the second patent in suit, 1,841,653; first of all, may I ask you whether apparatus as such is involved in this suit?

“A. Not directly.

“Q. The claims refer solely to the proposition of developing direct diazo prints: Is that correct?

“A. That is correct.

“Q. Now, with specific reference to claim 1, will you please state the elements of that process as defined in that claim?

“A. Claim 1 calls for two features; the first feature giving a certain composition of the developing fluid, in this case being an alkali liquid containing azodyestuff component and a reducing agent. The second feature is that this liquid is impressed

(Testimony of Frans Van der Grinten.)

on the surface to be developed in the form of a uniformly thin film.

“Q. What is a uniformly thin film?

“A. A uniformly thin film is a uniformly thin film.

“Q. Purely a relative term, is that correct?

“A. It is a clear term.

“Q. When is a film thin and when is a film thick? In other words, how thick is thin?

“A. You might as well ask me when is a building high and when is it low.

“Q. In other words, you cannot give a definite answer to that?

“A. No, of course not. [140]

“Q. One of the ingredients in the developing liquid specified in claim 1 is a reducing agent non-decomposable by alkali. How many reducing agents non-decomposable by alkali are known to chemists?

“A. I do not know.

“Q. Are they numerous?

“A. I do not know.

“Q. Is tartaric acid a reducing agent non-decomposable by alkali?

“A. Tartaric acid is a reducing agent which reacts with alkali and is changed into a tartaric salt; consequently one could not say that tartaric acid is indifferent toward alkali. It would on the other hand not be all right to say that tartaric acid is decomposable by alkali.

(Testimony of Frans Van der Grinten.)

“Q. In other words, it is not decomposed by alkali?

“A. It is not decomposed, but it is still changed.

“Q. Is the azodyestuff component a reducing agent non-decomposable by alkali?

“A. An azodyestuff component, as far as it is a reducing agent, is a reducing agent that is not concerned in this patent.

“Q. There are certain azodyestuff components which are reducing agents, are there not?

“A. Most of them are. That is the reason why they discolor.

“Q. There are also certain azodyestuff components which not only are reducing agents, but are also reducing agents or compounds non-decomposable by alkali, are there not?

“A. Most azodyestuff components as used in this process are so-called phenols—aromatic derivatives containing hydroxyl—OH—and they can interact with alkalis in the same way that acids can.

“Q. With reference to claim 3 of the second patent, we need not repeat the elements, but I will ask you whether or not the developing liquid contains in that case a reducing agent non-decomposable by alkali? I think it is quite positive it is not in there. [141]

“A. No, it does not.

“Q. Nor does claim 4 contain such a substance?

“A. Nor does claim 4.

“Q. Nor does claim 11?

(Testimony of Frans Van der Grinten.)

“A. Nor does claim 11.

“Q. Nor does claim 13?

“A. No.

“Q. Nor claim 16?

“A. No.

“Q. In other words, claims 3, 4, 11, 13 and 16 do not recite a reducing agent non-decomposable by alkali?

“A. That is correct.

“Q. One other question about tartaric acid: Is the tartaric acid complex changed by the alkali when you develop a tartaric acid layer with an alkali?

“A. May I ask you what you mean by a tartaric acid complex? I don't know what that is.

“Q. Then we will disregard the question. Inasmuch as claim 1, as you have stated, is merely a developing process, does it make any difference, in your opinion Doctor, what the developing liquid contains in so far as this patent is concerned?

“A. It does make a difference. The composition of the developer is of importance in connection with the mode of employing the developing liquid, itself.

“Q. The composition of the liquid is important in connection with the application thereof to a layer?

“A. In connection with the mode of application.

“Q. In claim 1 you include a reducing agent in your developing liquid, and in claim 3 you do not. Will you please explain your previous answer then

(Testimony of Frans Van der Grinten.)

in connection with that distinction between the developing liquids in claim 1 and in claim 3; in other words, explain why there is any difference in applying the developing [142] liquid of claim 1 to a sensitive layer and the developing liquid of claim 3.

“A. The difference is that when the process of claim 1 is carried out so as to add a reducing agent to the finished print by means of the developer, and that is not the case when the developer according to claim 3 is applied to the paper.

“Q. You stated that the actual development of the print is materially affected or in some way affected by the nature of the composition which you are putting on.

“A. It certainly is.

“Q. How do you explain that?

“A. I cannot explain it. I could give you an example of that.

“Q. Is that a substantive differentiation, or is it merely just a difference without a distinction; in other words, you have a composition in claim 1 which includes a reducing agent and you apply that to a base; in claim 3 you have a composition which does not include a reducing agent and you apply that to a base; what is the difference between the two actual processes of the developer?

“A. I have already explained that to you. What you were asking me about was the connection which exists between the mode of application and the composition of the liquid. I can explain that to you if

(Testimony of Frans Van der Grinten.)

you want me to.

“Q. How do you explain it?

“A. For instance, if I take a device which brings a large amount of liquid to the surface, for instance, a thin film which is twice as thick or half as thin as another device would do, then, of course, I apply twice as much solution or liquid to the surface and then my composition must, of course, be made so that I apply to the surface a quantity which is within the borders of giving a chemical inter-action and without too great an excess of other substances used. [143]

“Q. In your direct testimony you stated that this apparatus, a cross section of which is shown in this figure in the patent, is one method of carrying out the process, did you not?

“A. This is only one mode.

“Q. This particular apparatus can practice the process of claim 1.

“A. It certainly can.

“Q. And it can also practice the process of claim 3?

“A. It certainly can.

“Q. What difference does it make then whether you have a reducing agent in your composition or you leave it out, in so far as practicing a developing process is concerned?

“A. The difference is that in one the reducing agent is there and in the other it is not in it.

(Testimony of Frans Van der Grinten.)

“Q. That is the only difference; in other words, this claim 3 is really only distinguishable from claim 1 in the sense that you have left out a certain ingredient in the developing liquid?

“A. Yes.

“Q. And as far as developing is concerned, you can develop and obtain a thin film with this apparatus whether or not you have a reducing agent in the developer? Is not that correct?

“A. Yes. On the other hand, I would like to remark, however, that I am a chemist and not a United States patent attorney.

“Q. Are you familiar with the German patent to Groneau, German patent No. 427,570, issued in the year 1925?

“A. Yes, I am quite familiar with that patent.

“Q. I now hand you a printed copy of that patent and a typed translation thereof, and ask you whether or not the apparatus disclosed in that patent will practice the process of claim 1?

“A. It would not, by no means.

“Q. Why not?

“A. Because for carrying out the process of claim 1 it is [144] necessary to impress the liquid into a surface; the liquid—

Mr. HOFFMAN: Your Honor, I object to this examination. I did not touch on the prior art in the direct examination. This patent was not even touched on.

(Testimony of Frans Van der Grinten.)

Mr. WHITE: One is usually allowed some latitude on cross-examination.

The COURT: Yes, we allow considerable latitude on cross-examination.

Mr. WHITE: I can take it up with my own expert, however.

The COURT: Very well. Perhaps you had better do so.

“Q. Will you refer to claim 4 of the second patent in suit and will you state the difference between the process defined in claim 3 and the process defined in claim 4, particularly with reference to the recitation of saturating throughout its entire area the exposed surface of the prints. What is meant by that term? Physically, what do you do when you saturate a print throughout its entire area?

“A. When you saturate a print throughout its entire area—I do not saturate a print, when I saturate the surface of a print then I bring to that surface of the print an amount of liquid which fills up, so to say, the whole surface. The surface of a print is not the same thing as the surface of a glass plate. It is a thing which can be saturated. It is more or less, superficially at least, like a sponge which you could saturate.

“Q. Does the developer, when you saturate the entire surface, penetrate through the print?

“A. Not through the print, but into the surface of the print.

(Testimony of Frans Van der Grinten.)

“Q. How thick is the surface of this print?

“A. I do not know.

“Q. Are not the terms, ‘Saturating the entire surface’ inconsistent with the term ‘spreading a uniform thin film on the surface’? [145]

“A. Spreading a uniformly thin film on the surface is in this claim a feature to show how the saturating is done.

“Q. You say you saturate the exposed surface of the print with a developing liquid by spreading said liquid on said surface in the form of a uniformly thin film.

“A. Yes.

“Q. And you say there is no distinction or rather inconsistency, between saturation and thin film.

“A. No.

“Q. Does the apparatus which you show in the drawing of the patent saturate the entire surface of a direct print, or a layer?

“A. This apparatus can as well impress a certain quantity as well as to saturate the surface.

“Q. The only difference between claim 6 and claim 4 of the second patent resides in the fact that the developing liquid is altered by the inclusion of the reducing agent: Is that not correct?

“A. That is correct.

“Q. Take the first claims, namely, 1, 3, 4, and 6, and tell me whether or not in the sepia process prints were not developed in the same way?

(Testimony of Frans Van der Grinten.)

“A. No, they were not, at least I have never heard of such a development for sepia prints before.

“Q. How do you develop sepia prints in your own plant in Holland?

“A. When we make sepia prints we wash the prints out with water after they have been exposed.

“Q. Do you wash the entire print, or the surface of the print?

“A. We mostly wash the entire print, although we could wash off the surface by spraying water over it. It is mostly done by submerging in a water bath. After that we take the print mostly [146] into a bath which contains sodium thiosulfate, in order to take out of the print the rest of the silver salts which are not soluble in water, and which might remain in the paper, in order to fix it in exactly the same way as the fixation operation is done in the normal negative photography.

“Q. Is sodium thiosulfate a reducing agent non-decomposable by alkali?

“A. Sodium thiosulfate is a reducing agent that is non-decomposable by alkali.

“Q. And you say you can, in the sepia process, coat the surface of the print with a thin film?

“A. You could do it, but it would not be of any use to that process, because the sodium thiosulfate in that process is used to dissolve certain substances out of these prints, and it is no use to add thiosulfate only to those prints.

“Q. How do you develop other direct prints?

(Testimony of Frans Van der Grinten.)

“A. I don’t know what you mean by “direct prints.”

“Q. Take a print that you first obtain a negative with, how do you develop that?

“A. It depends entirely upon the photographic process you use.

“Q. You stated previously that you had developed a print having a layer containing an azodyestuff component and an acid; how did you develop that print? I am talking about the process as indicated on the right-hand side of Plaintiffs’ Exhibit 7.

“A. As I have already explained, the development of such a print takes place merely by the addition of an alkali, which may be a volatile alkali.

“Q. Turning to claim 8 of the second patent, the only difference between that and claim 6 resides in the fact that the developing liquid contains three substances, a non-volatile alkali substance, an azodyestuff component, and a reducing agent [147] non-decomposable by alkali, whereas in claim 6 the azodyestuff component is not included; is that correct?

“A. That is correct.

“Q. Your testimony is that because of the inclusion of the azodyestuff component in the developing liquid the process of development is different: Is that your testimony?

“A. It is indeed a different process. With the two-component layer, as indicated on the right-hand

(Testimony of Frans Van der Grinten.)

part of Exhibit No. 7, you only have to add an alkali, which in this case I can do by adding it by vapours or with an alkali alone, and in the process in which I only have the diazo compound in the layer I have to add an azodyestuff component by means of my developer.

“Q. The essential difference in the two processes of development lies only in the inclusion of a certain ingredient in your solution: Is not that correct?

“A. I don't think you are right in saying that, because the interaction between the diazo compound and the azodyestuff component can take place in quite a different way whether you added already to the sensitive layer and consequently mixed it already with diazo compound or whether you only added later on at the same time that you added the alkali. Any chemist who knows anything about the formation of azodyestuffs will know that the formation of an azodyestuff has very much to do with the conditions of the mixture. It consequently is a specific feature of a claim in a patent when it says that he adds the azodyestuff component to the developer instead of to the sensitive layer.

“Q. I can understand that Doctor, but why does it make any difference whether the developer contains one ingredient, or contains two ingredients, or contains three or more ingredients in order to apply a thin film of that developer upon a sensitive layer?

[148]

“A. I think I had better make the same remark that I have already made, that I am a chemist and not a United States patent attorney.

(Testimony of Frans Van der Grinten.)

“Q. If the alkali in this process here indicated on the right-hand side of Plaintiffs’ Exhibit No. 7 is a volatile alkali, how would you apply it?

“A. A volatile alkali can be applied in practically only one way, and that is in contacting the exposed print with the fumes of such alkali. This can be done in a slow way, for instance, by simply introducing such a print in a room where ammonia vapors are present; a much quicker way is, for instance, the way in which Groneau, the patentee you have been speaking about, does it when he brings his surface to be developed quite near to the surface from which his ammonia vapors emerge. In most cases the ammonia vapors act as such, as fumes, as a gas, upon the surface to be developed, like for instance, oxygen acting on copper plate, as I have described it in connection with my illustration of an oxidation action.

“Q. Referring to claim 11, Doctor, that is quite similar, is it not, to claim 8 in suit, with the exception that the azodyestuff component is contained in the sensitive layer in the first instance: Is that not correct?

“A. Claim 11 differs from the other claims more essentially because a special light-sensitive layer is used in this process, namely, one which contains a diazo compound of the type of a rapidly-coupling one which is a specific form of carrying out this process, and which has certain advantages.

“Q. And where the azodyestuff component is not in the layer?

(Testimony of Frans Van der Grinten.)

“A. Then, of course, it is not advantageous to have the azodyestuff component in the sensitive layer, but it is better to have it then in the developer.

“Q. Suppose you put all of your ingredients in your layer with [149] the exception of your alkali, your azodyestuff component in your layer, your reducing agent in the layer, and you have developed with an alkali, what is the essential difference whether you develop merely with the alkali or, as I said before, with four ingredients in the developer? What I am trying to get at, Doctor, is what is the essential difference in so far as the developing process, in itself, is concerned?

“A. As I have already told you, the formation of an azodyestuff is simply in principle, as I have explained it, namely, the interaction between a diazo compound and an azo coupling component which couple or go together and form one compound when conditions are favorable, that is to say, when the medium is alkaline. Of course, I had no reason for entering into these details before, but the interaction between the diazo compound and the azo coupling component can yield sometimes three or four different colors, which all can depend upon the fact whether they before had been mixed already in amounts which had certain relation to each other, and then are made alkaline or, first, whether the diazo compound is made alkaline and an acid solution of the azo coupling component added to that, or vice versa. In all these cases you can very often

(Testimony of Frans Van der Grinten.)

get quite different results. Therefore, it is very well to distinguish these two processes as being two different forms of carrying out this process.

“Q. Will you now turn to claim 13 of the second patent and tell me the distinction between the process defined in that claim over that defined in say, claim 6, for example? I might help you out there, Doctor. In the first place, there is no reducing agent non-decomposable by alkali mentioned in claim 13, is there?

“A. In claim 6 the saturating of the entire area of the exposed surface is done by spreading the liquid on the surface; [150] in claim 13 the saturating is done by first wetting the exposed surface with an excess of the liquid, and immediately thereafter removing this excess so as to depose a uniformly thin film of the liquid to the surface.

“Q. And claim 15 is similar to claim 13, except that the developing liquid contains a reducing agent non-decomposable by alkali: Is that correct?

“A. That is correct.

“Q. And claim 16 is similar to claim 15, excepting that the developing liquid contains an azodyestuff component instead of the reducing agent non-decomposable by alkali: Is that correct?

“A. That is correct.

“Q. While in claim 18, the difference between that and claim 16 is that the developing liquid contains all three ingredients, the non-volatile alkali substance, the azodyestuff component, and a reducing

(Testimony of Frans Van der Grinten.)

agent non-decomposable by alkali: Is that correct?

“A. That is correct.

“Q. As a matter of fact, Doctor, in developing prints of the prior art type, were not those prints developed by spreading a thin film of the developer on the exposed surface of the layer?

“A. No, they were not.

“Q. I am speaking now of a volatile alkali and not a non-volatile.

“A. Oh, I beg your pardon.

“Q. I am speaking of non-volatile alkalis, now.

“A. No, they were not. As far as I know they were bathed in a bath of developing liquid and consequently treated with an excess which was only partly removed.

“Q. As a matter of fact, could not a thin film be applied to a diazo sensitive layer by merely brushing the developing liquid on that layer?

“A. Then it would not be a uniformly thin film. [151]

“Q. But you do not know what a uniformly thin film is, do you?

“A. I know very well what a uniformly thin film is and I think everybody who reads this patent will know what is meant by a uniformly thin film. The thickness of the film, is of course, a relative thing. When the patent speaks of a thin film it must be thin in this sense, that the conditions which the patentee requires are fulfilled.

(Testimony of Frans Van der Grinten.)

“Q. Doctor, have you read the file wrapper of United States letters patent 1,821,281, the first patent in suit, have you gone over this file wrapper?

“A. Yes, long, long ago.

Mr. HOFFMAN: I object to that, your Honor. I did not touch on the file wrappers of the patent on my direct examination.

Mr. WHITE: The purpose of this testimony, your Honor, is merely to show that the Patent Office has not cited a single reference against any of the claims in the first patent. I think, inasmuch as the patent in suit has been thoroughly gone over on direct examination I should be allowed to go over it on cross-examination.

Mr. HOFFMAN: We will concede that, if that is all you expect to prove.

Mr. WHITE: That is all I want to get at for the present. There are no references cited at all.

The COURT: The file wrapper, itself, shows that, does it not, according to your statement?

Mr. HOFFMAN: And we concede that. There is no necessity of taking up time on that.

Redirect Examination

“Q. Now, Doctor Van der Grinten, you testified on cross-examination that you were familiar with sepia or brown prints. Will you please describe how sepia prints are made? [152]

“A. The light-sensitive layer used for making sepia prints consists of a silver compound and a

(Testimony of Frans Van der Grinten.)

ferric salt. Upon exposure to light such a sensitive layer deposits metallic silver in the form of a brown substance on the fiber of the paper. The exposed part of the print turns brown. The formation of the silver is due to the fact that the light is capable of reducing the ferric salt to ferrous salt, which ferrous salt in its turn again is capable of reducing the silver compound to metallic silver. Like in the blue-printing process, after the exposure the print has to be fixed, which in this case is done by taking out of those parts of the sensitive layer which have not been exposed to the light the substances which are in these parts. This is done by a washing operation with water. In consequence of the fact that certain silver compounds present in this sensitive layer are not soluble in water, the fixing operation, that is to say, the operation of taking the light-sensitive substances out of the non-exposed parts, is completed by a treatment with sodium thiosulfate, which substance is capable of forming with the silver salts, insoluble in water, new compounds which are soluble in water. So that by the treatment with the sodium thiosulfate all the silver compounds are removed from the print.

“Q. Are these sepia prints similar or different from positive diazo type prints?

“A. They are entirely different. In the sepia process silver and ferric salts are involved; in the positive diazo type process diazo compounds and azo coupling compounds are involved. Silver salts and

(Testimony of Frans Van der Grinten.)

ferric salts are chemically entirely different substances from diazo compounds and azo coupling components. The chemical reaction upon which the sepia process is based is entirely different from the chemical process involved in the diazo type process. There never can be drawn a parallel between these two processes. Besides, the sodium thiosulfate has [153] in the sepia process the function of dissolving the silver compounds, and when applied as a reducing agent to the finished diazo type print it acts as a reducing agent, counteracts an oxidation reaction, that is to say, the discoloration.

“Q. In the making of sepia prints is the sodium thiosulfate used for preventing discoloration of the background?

“A. In the sepia process the sodium thiosulfate is exclusively used for removing the insoluble silver salt from the paper, after which there is no more question of a discoloration, because no more chemical substances remain in the paper.

“Q. Are sepia prints and diazo type prints similar in background and images?

“A. They are, so to say, the opposite of each other. A positive diazo type print is a positive print, that is to say, the dark parts in the print correspond with the dark parts in the original, whilst the sepia process yields a negative, that is to say, the dark parts in the print correspond to the light parts in the original.

(Testimony of Frans Van der Grinten.)

“Q. In other words, as I understand you, the sepia print is just the reverse of this formula here, or this chart, Exhibit 12, in which these black letters, here, are on a white background. What is the difference between a sepia print, as compared to a print like this?

“A. The print which is numbered Exhibit No. 12 is a positive diazo type print and has been made from an original which had black letters on a transparent background. If from the same original a sepia print had been made the background would be brown and the letters would be white.

“Q. You testified on cross-examination that thiourea when brought together with an ammoniacal silver nitrate solution, that the thiourea cannot exercise its reducing action because of complications; what are those complications? [154]

“A. The complications consist of the formation of silver sulfide. On Exhibit No. 12 the formula of thiourea is shown. As I have already explained, thioureas contain one atom of sulfur; this atom of sulfur seems to be capable of reacting with the silver and thus form a silver sulfide. The silver sulfide is perfectly insoluble in water. Consequently, the silver of the ammoniacal silver solution forming with sulfur the sulfide can eliminate this from the solution so that no more silver is present in the solution. As soon as there is no more silver present in the solution it is impossible to reduce this silver compound and make silver out of it. This is the na-

(Testimony of Frans Van der Grinten.)

ture of the complication I have referred to when saying that thiourea, when it acted upon ammoniacal silver could not demonstrate its reducing properties.

“Q. You testified on cross-examination that when either glucose or aldehyde are brought together with an ammoniacal silver nitrate solution glucose and aldehyde do act as reducing agents; why is this?

“A. They do act as reducing agents upon the ammoniacal silver solution for the reason that they are reducing agents, and because in this case no complications are involved. This is due to the fact that neither aldehyde nor glucose contain sulfur, which could cause the complication as described in connection with thiourea.

“Q. Now, will you please refer to Example 1 in the first patent in suit and state which of the chemicals in this example is a reducing agent of the type which acts to arrest the discoloration?

“A. In this example the reducing agent of the type that acts to arrest discoloration is formaldehyde.

“Q. In this Example 1 what is the purpose of the compound B-oxynaphthoic acid anilide?

“A. The purpose of this substance is that it acts as the [155] azodyestuff component necessary for the formation of the azodyestuff in the positive diazo type process, as described already earlier extensively.

“Q. You stated on cross-examination that this B-oxynaphthoic acid anilide was a reducing agent;

(Testimony of Frans Van der Grinten.)

how does this reducing agent differ over the reducing agents which prevent or arrest the discoloration?

“A. As I have already explained, the discoloration of diazo type prints is due to the oxidation of certain substances present in the background of the diazo type print. These substances were the decomposed product of the diazo compound which was formed by the action of light and the azodyestuff component which was added to the exposed print, or already to the sensitive layer. These two substances undergo, as I have already stated, a change under the action of the oxygen of the air. I wish to refer to the test which I described, and in which we took a discolored diazo type print, cut it into two pieces, and stored in a room with and one in a room without air, which was a proof that the discoloration which took place in that part which was stored in the air was due to an oxidation. If any substance undergoes an oxidation spontaneously by the air it consequently is and must be a reducing agent. In order to prevent further misunderstanding on this point I wish to point out that in practically all those substances which discolor under the action of oxygen they are and must be reducing agents. It therefore is quite clear that in the invention in the first patent in suit we counteract the discoloration of reducing agents, which, when they act as reducing agents, that is to say, when they are oxidized—discolored by means of other reducing agents which

(Testimony of Frans Van der Grinten.)

counteract the oxidation of the first-named reducing agents. It is therefore clear that we must make a clear distinction between those reducing agents which cause the discoloration and those re- [156] ducing agents which counteract the discoloration. Of course, nobody—even we inventors,—can help it that these substances which discolor are and must be reducing agents also. Therefore, we have in formulating our invention to point out that the reducing agents which had to counteract the discoloration must of course not be of the type which would themselves discolor in the carrying out of their reducing action.

“Q. In the Kalle British patent No. 210,862, where does it say anything about the discoloration of the background of the finished diazo type print?

“A. Nowhere; there is not one word in the patent which relates to the finished print or to its discoloration.

“Q. Does this patent mention any ingredient which can act as a reducing agent capable of arresting discoloration of the background of the finished print in the environment into which Kalle puts it?

“A. In this environment the substances which are added to the finished print are not capable of arresting the discoloration of the finished print in an extent which is at all appreciable. I have tested this myself several times.

(Testimony of Frans Van der Grinten.)

The COURT: Does the defendant claim in any of the prior patents there was an arrest of discoloration?

Mr. HOFFMAN: His position is that this citrate or this tartrate, when you get through with the print, although the tartaric acid is added to the layer, that is a reducing agent, and that acts to arrest the discoloration.

“Q. In which examples in the first patent in suit is there stated a reducing agent which arrests discoloration in the finished print?

“A. In all the examples in this patent there are named reducing agents.

“Q. That is, specific reducing agents? [157]

“A. Specific reducing agents, yes.

“Q. Did there exist in the art at the time of your inventions diazo compounds which bleach upon exposure to light?

“A. There certainly did exist a good many diazo compounds fit for the purpose of making positive diazo type prints with. I refer, for instance, to diazo primulin; Green used the first one to carry out the first positive diazo type process. I refer to the diazo compound mentioned by Andresen, which is fit for the purpose. I refer to diazo carbazol, which was suggested for the purpose by Ruff & Stein, and to diazo anhydrides suggested by Kalle, and to the so-called diazo compounds in a wider sense, as claimed in Kalle's British patent, 234,818,

(Testimony of Frans Van der Grinten.)

and last, but not least, to diazo compounds which are mentioned by name in the first patent in suit.

“Q. Is not the invention of the first patent in suit based upon the discovery that the discoloration of the background of the diazo type prints was due to oxidation?

“A. Yes, it was.

“Q. In your opinion, do reducing agents when counteracting the discoloration, that is, when counteracting the aforesaid oxidation, act in a reducing manner?

“A. In my opinion they most certainly do. When an oxidation reaction is involved and a reducing agent which is capable of doing exactly the opposite of an oxidation is arresting such reaction, there is not the slightest doubt that this must be due to its reducing character. I have found not only that the reducing substances when counteracting an oxidation reaction like the oxidation reaction in this case act as reducing agents. And, moreover, that those parts of the molecules of the reducing agents which are capable of arresting an oxidation reaction are those parts which give the reducing action.

“Q. Will you now please refer to the second patent in suit [158] and state what you mean by a thin film?

“A. By a thin film in this patent is, of course, meant a film of a thickness which satisfies the purpose of the patent.

(Testimony of Frans Van der Grinten.)

Recross Examination

“Q. Referring to Plaintiffs’ Exhibit 12 Doctor, the formula which is shown on that chart indicates an amino compound, does it not?

“A. It certainly does.

“Q. The presence of the NH_2 radical or group in a compound does not necessarily mean that the compound is a reducing compound, does it?

“A. It not always does, although I might say that in most of the amino compounds the amino group is the cause for the reducing capacity, more specifically in this case.

“Q. Take the substance carbamide, is there an amino group or NH_2 group present?

“A. Yes, there is.

“Q. Is carbamide a reducing agent?

“A. Yes, it is a reducing agent.

“Q. Referring to the British patent 210.862, Plaintiffs’ Exhibit 20, did you not previously testify on cross-examination that the acid present in the sensitive layer was changed to a salt of that acid and remained in the finished print?

“A. Upon development with alkali this acid is transformed into a salt of this acid. When tartaric acid is used a tartrate is formed. When citric acid is used a citrate is formed upon development, so that the finished prints contain the salts and not the acids.

“Q. And both of those salts are reducing agents, are they not?

(Testimony of Frans Van der Grinten.)

“A. They certainly are.

“Q. And if used in sufficient quantities they will arrest the [159] discoloration of the background of that diazo print?

“A. They certainly will.

Further Redirect Examination

“Q. With respect to the British patent to Kalle, 210,862, does this patent state anything as to the quantity that is required to be used?

“A. It certainly does. On page 1, lines 80 to 83, the patent says: ‘To obtain still greater stability of the light-sensitive layer small additions of acid such as tartaric or citric acid are made.’

In Example 3, in the same patent, “In 1000 parts of water there are used 5 parts by weight of tartaric acid.” Consequently the tartaric acid is applied to the paper in a solution $\frac{1}{2}$ per cent. strong.

“Q. Then in the Kalle patent the tartaric acid is not added in an amount sufficient to arrest the discoloration of the background of the finished print?

“A. In the Kalle patent the tartaric or citric acid is not used in a quantity sufficient to form in the finished print tartrates or citrates in an amount sufficient to counteract the discoloration of the finished print in a way which would be at all appreciable.

The COURT: Q. That was not one of the purposes of the patent, either, was it?

(Testimony of Frans Van der Grinten.)

“A. It was in no way the purpose of the patent for adding these acids. The Patent adds the acids to prevent a premature reaction between the diazo compound and the azo component in the sensitive layer or exposure, because when such a reaction would have taken place then of course there would have been no more diazo compounds present and the whole process which is based upon the particular properties of the diazo compound [160] could not have been carried out.

“Q. Has Kalle taken a license under your patents?

Mr. WHITE: We object to that.

The COURT: Objection overruled.

“A. Kalle has taken several licenses under our patents.

“Q. In what countries?

“A. In nearly all countries of the world.

“Q. Is this the same Kalle that is the inventor of this British patent, 210,862.

“A. It is the same as the inventor of this patent, yes.

Mr. WHITE: If your Honor please, I think that the best evidence of that would be the license, itself. I think the answer should be stricken.

Mr. HOFFMAN: The question does not ask for the contents of the license. The question is whether he has taken out the license.

The COURT: Motion denied; exception noted.

(Testimony of Frans Van der Grinten.)

Further Recross Examination

“Q. The purpose of any diazo type process, Doctor, is to obtain a stable background, is it not?

“A. The first purpose of a diazo type process is to obtain a picture, a print from the original.

“Q. One that will not discolor but will remain stable?

“A. That is a second feature; as I have already explained to you, the diazo type printing was so well known before we entered the field with our invention.

“Q. Was it also well known that the decomposed products of the diazo compound and the azodyestuff component oxidize when the print was exposed to atmosphere?

“A. The only thing which was by that time known was that these prints showed a remarkable discoloration. It was not known [161] until further investigation that these substances were responsible for such discoloration, neither that it was an oxidation of these substances which was the cause of the discoloration.

“Q. What quantity of thiourea is necessary, in your opinion, to arrest the discoloration of the background of a diazo type print?

“A. I think that a solution of diazo compound so that it has to be applied to the paper so as to form a sensitive layer and there is added one or two per cent. of thiourea and a very remarkable improve-

(Testimony of Frans Van der Grinten.)

ment of the discoloration is already obtained, although when larger quantities up to for instance 4 or 5 per cent. are added this is still improved. [162]

TESTIMONY OF HUGO KLEIN, FOR PLAINTIFFS.

Hugo Klein, called as a witness on behalf of plaintiffs, being duly sworn testified as follows:

Direct Examination.

My name is Hugo Klein. I reside at 145 Emerson Avenue, Floral Park, New York. I hold the degrees of Bachelor of Arts, Bachelor of Science, and Chemical Engineer from Columbia University in the City of New York. Since my graduation, I have practiced my profession either as a chemist or chemical engineer. For some time I was employed by the E. I. Dupont de Nemours & Co., Inc., first as a chemist in their Jackson Laboratory, and then as a chemical engineer in their tetraethyl lead plant.

My present occupation is Chemical Engineer with the Charles Bruning Company, Inc., of 102 Reade Street, New York City, one of the plaintiffs in this case. The nature of my duties is to supervise the technical aspects of manufacturing operations, test all materials and products, solve any difficulties in manufacturing, and conduct research work. I have been in the employ of the Charles Bruning Company since May 13, 1929.

(Testimony of Hugo Klein.)

Mr. HOFFMAN: Your Honor, before proceeding any further I would like to read this stipulation into the record. Defendant admits that its Diepo Direcprint paper No. 500 has a sensitive layer which contains a diazo compound bleaching on exposure to light. That its developer for use in conjunction with its Diepo Direcprint paper contains an azodyestuff component and a non-volatile alkaline substance. You agree to that stipulation, do you, Mr. White? [163]

Mr. WHITE: I so stipulate.

My company was primarily engaged in the blueprint and photostat business before it went into the diazo type print business. At the time of joining the company, the matter of purchasing the two inventions of the patents in suit was pending. I was immediately made familiar with all of the aspects of the situation. All correspondence and test samples and reports were laid before me with a view to becoming fully acquainted with the situation so that I could advise the Charles Bruning Company in regard thereto and also put my department in shape for the marketing of the inventions of the patents in suit should the Bruning Company decide to purchase them. On August 1, 1929, the Bruning Company purchased the inventions and the price of \$30,000 was paid for them. The \$30,000 was to be paid in five annual installments but the Bruning Company was to have an exclusive license

(Testimony of Hugo Klein.)

to practice the inventions of the patents in suit during this payment period. Shortly after May 13, 1929, my company began the development of these two inventions incident to placing them on the market. In developing these inventions up to the present time and in putting them on the market the Bruning Company has spent approximately from \$147,000. to \$150,000. In all my company has invested close to \$180,000. in these inventions and patents.

My company began to market the inventions of the two patents in suit which have to do with the making of positive diazo type prints, and sensitized paper and the developer necessary for making the prints, in August, 1929. The sensitized paper is sold in the form of rolls and sheets under the trade-name BW Paper. The developer for this paper is sold in powder form in cans under the trade-name BW Developer. The process, as such, is marketed under the trade-name BW Process. The trade-name BW is registered in the U. S. Patent Office. [164] The purchaser of the BW Paper and Developer is granted the right to practice the BW Process based on the inventions of the two patents in suit. We advertise extensively in trade journals, and send out a lot of printed literature and pamphlets. I believe there is here in court two typical examples of the printed matter which we send to customers and prospective customers. One booklet

(Testimony of Hugo Klein.)

is titled "Black and White Magic." It is a nicely illustrated booklet in which there is described the scope and application of the process. The other booklet is entitled "BW Instruction Manual" giving instructions as to how to use BW Paper and BW Developer to obtain optimum results.

Mr. HOFFMAN: I offer in evidence a circular entitled "Black and White Magic," and the booklet entitled "BW Instruction Manual" as Plaintiffs' Exhibit next in order.

(The documents were marked "Plaintiffs' Exhibit 22.")

The BW Paper and BW Developer is marked with the patent numbers. From August, 1929 to date, we have sold 4,500,000 square yards of BW Paper and 100,000 cans of BW Developer powder. In the initial year, 1929, we sold 127,000 square yards of BW Paper and 2,300 cans of BW Developer. In 1933 we sold 975,000 square yards of BW Paper and 23,000 cans of BW Developer powder.

To the best of my knowledge, Defendant first began to infringe the patents on December 9, 1931. After learning of the infringement, we notified Defendant by letter, such letter being sent on September 16, 1932. Being handed a copy of such letter; it is the copy.

Mr. HOFFMAN: I offer the infringement letter in evidence and ask that it be marked Plaintiffs' Exhibit next in order.

(Testimony of Hugo Klein.)

(The document was marked "Plaintiffs' Exhibit 23.")

I purchased some of Defendant's paper and developer by placing a requisition with our purchasing department in [165] New York for a roll of Defendant's paper and the developer therefor. This requisition was forwarded to our Los Angeles branch who, in turn, purchased a roll of Defendant's paper and developer directly from the Dieterich-Post Company, I received this on November 1, 1932. I found on examination of the roll that it was labeled "Dieterich-Post Diepo Direcprint Paper No. 500." The developer was labeled "Developer Therefor". Accompanying the roll of paper and developer was a packer's memo and an invoice covering the sale. Being handed copies of the packer's memo and invoice; Yes, these are copies thereof.

Mr. HOFFMAN: It is stipulated, your Honor, that we can introduce a photostatic copy. I introduce in evidence a photostatic copy of the package memo and the bill for the purchase of this product as Plaintiffs' Exhibit 24.

(The document was marked "Plaintiffs' Exhibit 24.")

Being handed labels and asked whether or not they were on the roll of paper received on November 1, 1932; Yes, I cut off these labels from the roll of paper with my own hands before leaving for the West.

(Testimony of Hugo Klein.)

Mr. HOFFMAN: I offer in evidence the labels attached to the roll of Defendant's Diepo Direcprint paper and ask that it be marked Plaintiffs' Exhibit next in order.

(The labels were marked "Plaintiffs' Exhibit 25.")

Being handed General Directions for Using Diepo Direcprint Paper and asked whether they were attached to the roll of Diepo Direcprint Paper received on November 1, 1932; No, it was not attached to the roll but it was tucked into the fold of the outside wrapper of the roll.

Mr. HOFFMAN: I offer in evidence the paper showing the General Directions for using Defendant's Diepo Direcprint paper and developer as Plaintiffs' Exhibit next in order.

(The document was marked "Plaintiffs' Exhibit 26.") [166]

Being handed a piece of the paper taken from the roll of Diepo paper; Yes, it is for I cut this piece out of that roll myself before coming West.

Mr. HOFFMAN: I offer in evidence this specimen of Defendant's Diepo Direcprint paper and ask that it be marked Plaintiffs' Exhibit next in order.

(The paper was marked "Plaintiffs' Exhibit 27.")

Being handed the tube of developer which accompanied the roll received on November 1, 1932;

(Testimony of Hugo Klein.)

Yes, it is. Of course, some of the powder has been taken out for analytical purposes.

Mr. HOFFMAN: I offer in evidence a specimen of Defendant's developer and ask that it be marked Plaintiffs' Exhibit next in order.

(The specimen of developer was marked "Plaintiffs' Exhibit 28.")

"Q. Have you analyzed a specimen of defendant's Diepo Direcprint paper No. 500 to determine whether it contains a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of the finished print and, if so, with what results?

"A. Yes, I have. I found that it contains thiourea.

"Q. Will you please explain your test which established the presense of thiourea in defendant's Diepo Direcprint paper?

"A. I have prepared a chart which represents diagrammatically the steps that I pursued in my analysis. I would like to refer to it because I think it will clarify the whole situation.

Mr. HOFFMAN: Before proceeding with this, I would like to point out, because of the stipulation that we have entered into, this part of the chart will not have to be considered, because this analysis that is contained under these black chalk marks, and this portion on the left hand of the chart, with reference to establishing that in this defendant's paper there is a diazo compound which bleaches on

(Testimony of Hugo Klein.)

exposure to light, the [167] stipulation has taken care of that in that the defendant has admitted that its paper contains that type of compound, so therefore we need not take up that question here. All that the witness will testify now is as to how he took this specimen and proceeded with it and conducted the necessary analysis whereby he determined that thiourea was in the paper.

“A. In order to satisfactorily analyze the components of the sensitized layer of the defendant's paper, it was necessary to remove this light-sensitized layer from the base paper. After several experiments I hit upon a satisfactory method of accomplishing this, which consisted merely in taking approximately ten yards of the defendant's paper and laying it between two pieces of filter paper of the same size, and then rolling the three pieces of paper up tight, in as tight a roll as I possibly could, and taping the outside with electrician's tape. After having applied the tape I lacquered the outside of this roll twice; in rolling up I was unable to roll it up so tight that there would not be a core in it which was open; in order to stop this up I placed a cork in the bottom of the core and poured molten paraffine in that, and permitted that to solidify. After the paraffine had solidified, as I have graphically shown here, the roll of paper I had was waterproof on the outside, in which the core was filled with paraffine, and which consisted of alternate layers of defendant's paper between the filter paper.

(Testimony of Hugo Klein.)

I then set this roll up vertically and to the top of it I attached an inverted glass funnel by means of a piece of an auto inner tube, and I took the bottom of the roll and placed it in a glass funnel, as represented diagrammatically here. Then I connected the upper funnel with a source of water supply and opened this so that the water began to percolate down into the funnel and through the roll which I had so built up. Obviously, the core of this roll being filled with paraffine, the outside of it being [168] waterproofed by means of electrician's tape and lacquer, the only path that that water could pursue would be through the roll between the filter paper. At the end of about seven hours the first drop of extract began to appear in the receptacle down here. At the end of 24 hours, approximately three liters of extract of sensitized layer had collected down here. This extract was a yellow solution, and upon opening the roll at the end of 24 hours I found, indeed, that all of the yellow sensitizing layer had been removed from the base paper, leaving the base paper in its original state, namely, a white paper. Now, this extract which I had in this vessel having a volume of approximately three liters was too large to handle for analytical purposes, so I subjected it to a well-known operation, well-known to all chemists, of concentration, which consists merely in subjecting the extract to heat so that the solvent evaporates. This concentration was effected at a carefully con-

(Testimony of Hugo Klein.)

trolled temperature in order to be sure that none of the constituents of the defendant's paper were injured by excess of heat. The concentration was accelerated by the use of a hot blast fan which removed the vapors as rapidly as they formed; at the end of the concentration I had a concentrate of approximately 100 cubic centimeters in volume; it had collected particles of dust and lint from the paper, and I removed those by filtration. Now, as the defendant's paper is a diazo type paper, I thought it reasonable to assume that it had a diazo compound in it. It is a well known fact that diazo compounds can be precipitated from an acid solution by the addition of certain salts, such as sodium sulfate, stannic chloride, and the like. Therefore, to the concentrated filtered extract in this vessel I added sulfuric acid, as represented diagrammatically here, in order to acidify it, and sodium sulfate, as represented there, and immediately the diazo compound began to precipitate in the [169] form of the yellow precipitate which is an addition compound of the diazo compound and sodium sulfate. The precipitate is represented diagrammatically by the cross hatched portion shown as settling down in the bottom of the vessel. When the precipitation was completed, that is to say, after the successive additions of sodium sulfate necessary to bring all of the yellow compound down to the bottom here, I removed the diazo compound from this system by simple filtration, the diazo precipitate remaining

(Testimony of Hugo Klein.)

on the filter as shown by the cross hatched portion, and the filtrate coming down below in the form of an essentially colorless solution. I had every reason to believe that if the defendant's sensitized layer contained a reducing agent that reducing agent would be thiourea. I therefore proceeded in my subsequent tests on this assumption. Now, it is a well-known fact to chemists that when a pure solution of thiourea is treated with the reagent cuprous chloride and hydrochloric acid a very characteristic white precipitate forms, which is an addition compound of thiourea and cuprous chloride. Therefore, to this filtered extract of the defendant's paper I added, as represented here, a solution which contains .65 of 1 per cent. cuprous chloride and 3 per cent. of hydrochloric acid, and immediately obtained a white precipitate of the thiourea-cuprous chloride complex which resembles exactly the precipitate which one would obtain under similar circumstances from pure thiourea. This, in itself, is one proof that the filtered extract of defendant's paper contains thiourea.

But I wanted to establish that fact very firmly. In this test I filtered out the white precipitate in the normal fashion and as I was no longer interested in the filtrate I discarded it, as shown here. Having now the white precipitate on the filter, I washed it several times with dilute hydrochloric acid in order to remove possible excess of cuprous

(Testimony of Hugo Klein.)

chloride, or any other [170] matter that was not involved in the subsequent tests. Now, having the white precipitate on the filter paper I wanted to dissolve it. It is a well-known fact that the thiourea-cuprous chloride precipitate will dissolve readily in potassium cyanide solution, the mechanism of the dissolving being that the complex compound is split apart into its two constituents, namely, thiourea and cuprous chloride, and the cuprous chloride subsequently reacts with the potassium cyanide to form potassium cupro cyanide. Therefore, I took my precipitate which had been filtered and washed, as shown here, and bringing it down here I added a potassium cyanide solution to it and it dissolved in the potassium cyanide to form a clear solution. Having completely dissolved the precipitate in that fashion I evaporated the solution to dryness on the steam bath, carefully controlling the temperature, and watching so that nothing in the solution would be injured by excess heat, the temperature being maintained below 105 degrees centigrade; I had a dry residue as the result of this evaporation, and I knew that the main constituents that were contained would be thiourea and potassium cupro cyanide. It is a well known fact that thiourea is soluble in absolute alcohol, whereas potassium cupro cyanide is not. Therefore to the residue which I secured as the result of evaporation I added absolute alcohol, as shown here, and stirred up the residue into the alcohol and boiled vigorously; after

(Testimony of Hugo Klein.)

boiling for some time I decanted the absolute alcohol solution, bringing it down to this point, here, and then added another portion of absolute alcohol to the residue from which I had decanted the first addition of alcohol, and repeated the operation. I did this four times, and at the end of that time I had the four decanted portions in one, as represented down here. The residue was discarded, as I had no longer any interest in that. I then took the alcohol solution of [171] the substance which I believed to be thiourea and evaporated it to dryness on the steam bath, again keeping the temperature below 105 degrees centigrade. I then subjected the residue from the evaporation to the well-known purification operation with which all chemists are familiar, and which is known as recrystallization; in recrystallization of the residue I used absolute alcohol as a solvent, and finally obtained a pure white residue which I proceeded to establish was in fact thiourea. Now, there is a first reaction which it is well known that thiourea will give. If one takes pure thiourea and adds acetic acid and then potassium ferro cyanide, there is a color change in which the light yellow color of the solution changes first to green and finally to a permanent blue. I therefore took a small portion of this white residue and brought it down as graphically shown here, added acetic acid as shown there, and then I added a little potassium ferro cyanide and I obtained a color change from light yellow to green

(Testimony of Hugo Klein.)

and blue exactly as pure thiourea would have done under similar circumstances. The second test which is characteristic of thiourea is as follows: If pure thiourea in a water solution is treated with sodium carbonate which would make it alkaline and then potassium ferro cyanide added to that water solution of thiourea with sodium carbonate in it, there is a change from light yellow to deep violet; the color change is rather slow in coming about and the violet, while it is formed, is not permanent, but it can be brought back instantly by a further addition of potassium ferro cyanide. I therefore took a second portion of this white residue and dissolved it in water and brought it down into this position, made it alkaline with sodium carbonate and then added potassium ferro cyanide thereto and obtained a color change from light yellow to violet, exactly as pure thiourea would do under similar circumstances. The violet color was [172] not permanent, but immediately upon additional potassium ferro cyanide being added the violet color was regenerated. The third test which is very characteristic of thiourea is that when thiourea is heated for an extended period it undergoes a conversion to an entirely different compound known as ammonium thiocyanate. Ammonium thiocyanate has a property which thiourea has not, namely, that it will give a blood-red color with ferric iron in the form of ferric chloride or any other ferric salt. I there-

(Testimony of Hugo Klein.)

fore took a third portion of the white residue which I believed was thiourea, and without heating it I immediately added ferric chloride thereto, and did not obtain any blood red color. This established that my white residue had no ammonium thiocyanate in it.

I took a fourth and final portion of this white compound and heated it for perhaps an hour at a temperature of 140 to 160 degrees and at the end of that time I took that heated powder and dissolved it in water and added ferric chloride thereto and immediately obtained a blood red color which indicated that thiourea had been converted by the heat reaction to ammonium thiocyanate, which gave a blood red color with ferric chloride. I thus established by this test, this test, and this test, that the defendant's paper, the light-sensitive layer of the defendant's paper, did in fact contain thiourea.

"Q. Mr. Klein, in connection with the test on thiourea, you stated you took the thiourea and heated it.

"A. Yes.

"Q. To convert it over to ammonium thiocyanate. Will you please state the temperature to which you heated it?

"A. I heated it at a temperature above 140 and below 160 degrees.

"Q. Was that on the centigrade scale or on the Fahrenheit scale?

"A. On the Fahrenheit scale.

(Testimony of Hugo Klein.)

Mr. HOFFMAN: I will offer in evidence the chart on the [173] analysis of defendant's paper as Plaintiffs' Exhibit next in order.

(The chart was marked "Plaintiffs' Exhibit 29.")

"Q. Does thiourea, when present in the background of a finished diazo type print exhibit the property of arresting the discoloration of such background under normal conditions of keeping and storage and if so please explain your reason for so saying.

"A. Yes, thiourea does arrest the discoloration of the background of the prints, and my reason for so stating is that I have made prints in exactly the same way, except that one print contained thiourea in the background and the other did not, and the print containing the thiourea showed practically no discoloration, whereas the print which had no thiourea in it showed an appreciable discoloration.

"Q. Will you please produce for the inspection of the Court a specimen of a positive diazo type print which has thiourea therein and explain how it was made?

"A. Which has thiourea in it?

"Q. Yes.

"A. I have such a print here. This print was made from a sensitized paper in which the sensitized paper contained 2 per cent. of the diazo compound known as para-diazo-diphenylamine, .75 of 1 per cent. of oxalic acid, the oxalic acid being

(Testimony of Hugo Klein.)

added to stabilize the diazo compound and maintain it in its original state. This sensitized paper was exposed to light in the ordinary fashion under a tracing, and after exposure there was added a developing solution containing $2\frac{1}{2}$ per cent. of sodium carbonate and $\frac{1}{2}$ per cent. of phloroglucinol, and immediately after development the print was dried and this is the resulting print.

Mr. HOFFMAN: I will now offer in evidence the specimen of the finished diazo type print with thiourea therein as Plain- [174] tiff's Exhibit 30.

(The specimen was marked "Plaintiff's Exhibit 30.")

"Q. Now, will you please produce for the inspection of the Court a specimen of a positive diazo type print which has no thiourea therein and explain how it was made?

"A. I have a print of that diazo type. This print was made from a sensitized paper in which the sensitized layer contained 2 per cent. of para-diazodiphenylamine, and $\frac{3}{4}$ of 1 per cent. of oxalic acid, the oxalic acid being incorporated merely for the purpose of stabilizing the diazo compound and maintaining it in its original form. This sensitized paper was exposed to light in the normal fashion under a tracing, and after exposure it was developed with a developing solution containing $2\frac{1}{2}$ per cent. of sodium carbonate and $\frac{1}{2}$ per cent. of phloroglucinol, and immediately after development the print was dried and this is the print.

Mr. HOFFMAN: I will offer this specimen of

(Testimony of Hugo Klein.)

positive diazo type print having no thiourea therein as plaintiff's exhibit next in order.

(The print was marked "Plaintiffs' Exhibit 31.")

"Q. Now, Mr. Klein, will you please state when these two specimens, Plaintiff's Exhibits 30 and 31 were made, and how they were kept after they were made?

"A. They were both made on April 16, 1934. They were both kept in exactly the same way, which was the normal way in which prints of this type would be stored under ordinary conditions or usage, that is to say they were laid on my desk for two or three days, and then they were put in the drawer for several days, and then they were taken out of the drawer and put on the desk again, and this process continued until we left for the trial.

"Q. When did you leave for the trial?

"A. October 22. [175]

"Q. Is this the common manner of keeping these prints for preservation purposes?

"A. Well, it is an approximation of that, that is to say prints like this are kept in files, or drawers, or possibly in a book, and then drawn out from time to time to be examined and placed back in the file or drawer, or book, whatever the case may be.

"Q. Will you please examine these two exhibits with particular reference to their background, and state what they show?

"A. Exhibit No. 31, which contains no thiourea, in the background, exhibits a marked discoloration of the background, whereas Exhibit No. 30, which

(Testimony of Hugo Klein.)

does contain thiourea in the background exhibits practically no discoloration.

The COURT: During the recess I wish you would either by consent or otherwise have the witness indicate on those papers the distinction between the two.

Mr. WHITE: That is, with thiourea and without thiourea?

The COURT: Yes.

Mr. HOFFMAN: It is already indicated there, your Honor.

The COURT: All right, if it is already there. I didn't know it. You may proceed.

Mr. HOFFMAN: "Q. Have you analyzed the specimen of defendant's developer to determine whether or not it contains the reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of the finished print and, if so, with what result?

"A. Yes, I have. I found that it contains a thio-sulfate.

"Q. Will you please describe in detail your test which establishes that defendant's paper contains thiosulfate?

"A. I have prepared a chart for that purpose, and I will refer to it.

Mr. HOFFMAN: Just a moment, if you please. Your Honor, [176] before the witness proceeds I would like to call attention to the fact that in view

(Testimony of Hugo Klein.)

of the stipulation, or the admission of the defendant by stipulation that this developer has an azo coupling component and a non-volatile alkaline substance it will not be necessary to discuss these two tests; first phloroglucinol test to establish that defendant's developer has an azodyestuff component; this other test on the right-hand column of this chart is for a carbonate; that is the non-volatile alkaline substance. In view of the stipulation and the admission it is needless to go into that.

The COURT: You mean it is needless to go into the part marked with the cross on this chart that will be marked Plaintiffs' Exhibit 32.

Mr. WHITE: If the Court please, before the witness proceeds with any testimony in connection with this exhibit I would like to raise this objection. The issues in this trial up to about six or seven weeks ago included claims 7 and 9 of the second patent, calling for the use of a developer containing sodium thiosulfate. Six weeks ago those claims were withdrawn under protest by me. Your Honor allowed the withdrawal of those claims. Now the plaintiffs propose to introduce testimony that the defendant's developer contains thiosulfate, which they have withdrawn from the issues in the case. I think the plaintiff is estopped to introduce testimony along that line.

Mr. HOFFMAN: Your Honor, in connection with that I will say that this is rather a broad invention. In this second patent we describe and dis-

(Testimony of Hugo Klein.)

close a great number of reducing agents which are of the type that when they are present in the background of the finished print they will arrest discoloration. During the consideration of these claims, and in preparing for the trial I went into this matter very thoroughly, and I found that claims 7 and 9 were invalid because of a prior patent. So, according to the recent Supreme Court decision in the Ensten case, I immed- [177] iately filed in the United States Patent Office, a disclaimer as to these two claims. Of course, in an invention you naturally have generic claims and specific claims. In view of the fact that this species that we had in our patent is invalid because of prior art, we naturally took out those claims. We have not attempted to sue on those claims. The reason why we filed the disclaimer is not in issue in this suit.

Mr. WHITE: If the plaintiff admits that the use of a thiosulfate in the developer is old in the art I cannot see how in any respect defendant would be infringing if it did use thiosulfate in its developer. I cannot see what the purpose of the testimony is.

Mr. HOFFMAN: The purpose of the testimony is this: We disclose in the patent that we can use a developer which has a reducing agent in it of a type that prevents discoloration. The art is taught by that patent. A man will come along after the patents go out, a man skilled in the art will see

(Testimony of Hugo Klein.)

these patents, and naturally a man will come along and will find that thiosulfate is a very good reducing agent. He will then file an application in the Patent Office and they will grant him a patent, because that is a specific invention falling under the broad invention. As a matter of fact, when a man opens the art and points the way, naturally he cannot begin to disclose all the specific reducing agents that will work in that particular process. He discloses as many as he can. Then developments start. As a result of those developments the fellow that is working on this particular reducing agent finds it works very well. Yet he takes the teaching out of the basic patent. Naturally, because he discovers that a particular reducing agent is peculiarly adapted to this particular art he is able to get a patent. That is also true of another man who finds another species. That is the way the art develops.

Mr. WHITE: Your Honor, I think plaintiffs' counsel is going [178] off on a general discussion of patent law. He stated here that he withdrew claims 7 and 9 and filed a disclaimer in the United States Patent Office because those claims were invalid because of the prior art. How can he possibly get a generic claim on a reducing agent if the prior art shows a species of reducing agents such as thiosulfate?

The COURT: Objection overruled; exception.

Mr. HOFFMAN: Your Honor, with respect to thiosulfate in defendant's developer, this is clearly

(Testimony of Hugo Klein.)

covered by the first patent in suit, and that is not anticipated by any prior art. As to the second patent, I would like to explain the situation a little more in detail so as to clarify the matter, because I am afraid that probably the way I explained it previously you did not fully understand it. As to the second patent, you will note at the head of the patent that there is a Netherlands application referred to. The filing date of that is August 22, 1927. We filed the corresponding application in this country on August 11, 1928. Upon checking over The Netherlands application filed August 22, 1927, with the application filed here in this country on August 11, 1928, I found that the example 2 on page 3 of this patent which contains a basis for claims 7 and 9 which are directed to the use of thiosulfate particularly was not included in the Holland application or The Netherlands application. Therefore, the subject-matter of example 2 would have to rely for its date of invention on the filing date of application in the United States, namely August 11, 1928. Upon checking this matter with the prior art I found a patent which disclosed the use of thiosulfate in a developer for use in making positive diazo type prints of the type which do not discolor upon extended periods of keeping. The effective date of that patent was one month prior to our filing date here in the United States. As I recall it, the effective date of that United

(Testimony of Hugo Klein.)

States patent was July 14, 1928. When I found that condition, your Honor, I immediately filed a [179] disclaimer as to these two specific claims, because in that situation we then had two United States patents claiming substantially the same subject-matter. In view of the fact that the inventor of this second patent is a foreigner, and also the inventor of the prior patent which had a date of July 14, 1928, was also a foreigner, the question would turn on priority in determining who would get the claims in the patent, or who would be entitled to the claims in the patent. That question of priority turns solely on the question of reduction to practice in this country. That would be the question which would arise as between Van der Grinten, the inventor of the second patent here in suit, and the British citizen who had this other patent, the patent that has a filing date one month prior to the filing date of our second patent. The earliest date we could get for a reduction to practice of the invention in this country would be our filing date here in the United States, in other words, August 11, 1928. That would likewise be true as to this British citizen, the inventor of the other patent who had the date July 14, 1928. So, no matter what we did, we could not prove priority of invention and we would lose out. Therefore, those claims would be invalid. In addition, I might also say that there is a reference in the prior art whose date is June 14, 1928, which clearly antici-

(Testimony of Hugo Klein.)

pates not only these two claims 7 and 9 in the second patent in suit, but also one claim in this United States patent—and I am referring to the patent that had a filing date July 14, 1928. In view of those circumstances, and in view of the recent decision of the Supreme Court in the Ensten case, I immediately filed a disclaimer as soon as I ascertained that fact. Simultaneously, I took steps to withdraw these claims from suit. That is the situation with respect to these two patents. One thing I would like to make clear is that irrespective of the situation with respect to the second patent, thiosulfate is clearly [180] covered by the first patent in suit, and is not anticipated by the prior art.

Mr. WHITE: If the Court please, I think, in view of the fact that plaintiff's counsel has stated that he has filed a disclaimer in the United States Patent Office with respect to claims 7 and 9 in the second patent in suit, the defendant is entitled and the Court should see and have before it a copy of that disclaimer. In view of the fact that the plaintiffs' counsel has stated and has made reference to a foreign patent with the filing date of July 14, 1928 showing a disclosure of sodium thiosulfate, I think that the defendant is entitled to have produced here a copy of that patent. I think the Court would be benefited by having that before it. I am asking plaintiffs' counsel now to produce those two papers, one the copy of the disclaimer

(Testimony of Hugo Klein.)

filed in the Patent Office and, second, the copy of the foreign patent to which he has referred in which is disclosed sodium thiosulfate.

The COURT: The chief purpose in withdrawing those claims concerns the matter of costs, does it not?

Mr. HOFFMAN: The reason I withdrew those claims is because there is a provision which specifically states that you are to proceed promptly when you find out that some claims in your patent are obviously invalid. If you file this disclaimer after the suit has been started you will lose your costs of suit. That is the way the statute reads. I mean you will lose the costs of the suit as regards that one patent.

The COURT: Can't you withdraw them any time just before the trial and save the costs?

Mr. HOFFMAN: I really am not very clear on that point, your Honor.

The COURT: I may be wrong about it, myself. However, I have overruled the objection and I will adhere to my ruling. [181] Exception noted.

Mr. WHITE: The reason that I made the objection, your Honor, with respect to the introduction of testimony on thiosulfate being in the defendant's developer is because the second patent relates solely to a developing process and sets out in the claims the composition of the developing fluid or developing liquid which is used. Having

(Testimony of Hugo Klein.)

withdrawn from the suit claims which include a developer having sodium thiosulfate in it, I believe and I contend, and I submit to the Court, that the plaintiff is not entitled to introduce any testimony whatsoever, whether it be toward the first patent or whether it be toward the second patent, wherein the testimony tends to prove that sodium thiosulfate is in the defendant's developer. The proof may be that sodium thiosulfate is in the finished print, or is in the paper. So far as the developer, itself, is concerned, that is another matter. They have withdrawn it.

The COURT: Objection overruled; exception.

Mr. HOFFMAN: Q. Will you please, Mr. Klein, begin your description of this test right from the beginning?

"A. I was to establish the fact that the test developer contained thiosulfate. I took a portion of the defendant's developer powder——

Mr. WHITE: Just a moment, please. For the purpose of the record, your Honor did not rule on my request to furnish a copy of the disclaimer and a copy of the foreign patent.

The COURT: Counsel says that he has withdrawn those two claims.

Mr. HOFFMAN: And the disclaimer is of record, your Honor.

Mr. WHITE: You say it is in the record?

Mr. HOFFMAN: It is of record in this case, yes.

(Testimony of Hugo Klein.)

Mr. WHITE: I would like to see it.

Mr. HOFFMAN: I will show it to you.

The COURT: The statement of counsel that he withdraws those [182] two claims is sufficient; proceed.

“A. I took a portion of the defendant’s developer powder, which was apparently a homogeneous cream-colored powder, and placed it in beaker as shown here; I added water thereto, as represented diagrammatically on Exhibit 32, here, and stirred the water and powder until I had secured a complete solution of the powder and the water. It is a well-known fact that when a neutral solution of thiosulfate is acidified the thiosulfate is decomposed with the formation of fumes of sulfur dioxide and of a precipitate of sulfur. I therefore proceeded on this basis: First of all, I neutralized this water solution of the defendant’s developer powder with hydrochloric acid as represented graphically on the diagram. I then brought that neutralized solution of defendant’s developer powder down to this point on the chart. I acidified it as shown here with hydrochloric acid, and immediately the solution turned a yellow cloudy color and fumes of sulfur dioxide were apparent, not only by their odor, which is a characteristic sharp odor, but by the fact that when a piece of paper saturated with iodine was held in those fumes it was immediately decolorized. Both of those characteristics, the sharp odor and the fact that sulfur dioxide will

(Testimony of Hugo Klein.)

bleach iodine, they are characteristics, themselves which establish the presence of sulfur dioxide. I then heated the beaker in order to accelerate the precipitation of the sulfur as in the cold the precipitation of sulfur is rather slow; upon heating the sulfur collected in the bottom, as represented by the black portion, here, and more fumes of sulfur dioxide were evolved. I took the sulfur precipitate and filtered it out as shown here, collecting the yellow precipitate on the funnel, as shown in black. I was no longer interested in the filtrates, and I discarded them; I washed the yellow precipitate on the funnel several times with water in order to remove all traces of acid; of course, I dis- [183] carded the washings also, as I was not interested in them. I then took the yellow precipitate from the funnel and dried it thoroughly. After I had the yellow precipitate in a dry form I placed it in a long handled spoon, which is known as a deflagrating spoon—of course that is immaterial here, but in passing I mention it—and ignited that yellow precipitate by means of a Bunsen burner. It is a well known fact that pure sulfur, when it burns in air, burns with a very beautiful blue flame; in so doing it combines with the oxygen of the air to form sulfur dioxide. When this sulfur had taken fire and became ignited, or, rather, when this yellow substance had been ignited by the Bunsen burner, it did burn with a blue flame, and it did give fumes of sulfur dioxide, which I recognized by their odor

(Testimony of Hugo Klein.)

and the fact that they decolorized a piece of paper saturated with iodine. I thus proved that the defendant's developer powder contained thiosulfate.

Mr. HOFFMAN: I offer in evidence the chart showing the analysis of defendant's developer as Plaintiffs' Exhibit 32.

(The chart was marked "Plaintiffs' Exhibit 32.")

"Q. Are these tests characteristic of any thiosulfate?

"A. Yes, they are.

"Q. What is the most common thiosulfate?

"A. Sodium thiosulfate.

"Q. Are all of the thiosulfates reducing agents?

"A. Yes, they are.

"Q. Do thiosulfates such as sodium thiosulfate, when present in the background of the finished diazo type print exhibit the property of arresting the discoloration of such background under normal condition of keeping or storage and, if so, please explain your reasons for so stating.

"A. Yes, they do. My reason for so stating is that I have made prints which were exactly identical in their constitution and [184] mode of manufacture, except that the one contained sodium thiosulfate in the background and the other did not. The former print with sodium thiosulfate in the background showed practically no discoloration after extended periods under normal conditions of storage, whereas the print which had no thiosulfate

(Testimony of Hugo Klein.)

in the background showed a marked discoloration under similar circumstances.

“Q. Will you please produce for the inspection of the Court a specimen of a positive diazo type print which contains sodium thiosulfate therein?

“A. I have one here.

“Q. Mr. HOFFMAN: I offer this specimen of a finished diazo type print with sodium thiosulfate therein in evidence as Plaintiffs' Exhibit 33.

(The specimen was marked Plaintiffs' Exhibit 33.”)

“Q. Will you please describe how Plaintiffs' Exhibit 33 was made?

“A. This exhibit was made from a sensitized paper in which the light-sensitive coating containing two per cent. of a diazo compound known as para-diazo-diphenylamine; .75 of 1 per cent. of oxalic acid, the oxalic acid being added merely to stabilize the diazo compound in the layer, that is to say, to keep it in its original state until exposure. This paper thus sensitized was exposed in the normal fashion under a tracing, and after exposure it was developed with a developing solution containing $2\frac{1}{2}$ per cent. of sodium carbonate, $\frac{1}{2}$ of 1 per cent. of phloro-glucinol, and 4 per cent. of sodium thiosulfate. Immediately after development the print was dried and this is it.

“Q. Will you state when this Exhibit No. 33 was made, and how you kept it?

(Testimony of Hugo Klein.)

“A. It was made on April 16, 1934, namely on the same date as Plaintiffs’ Exhibit 31, and the other exhibit of the same type—I don’t recall the number. [185]

“Q. Exhibit 30?

“A. Yes, Exhibit 30, and it was stored under the same conditions as those two exhibits.

“Q. Will you please compare Plaintiffs’ Exhibits 31 and 33 and explain what the background showed?

“A. Plaintiffs’ Exhibit No. 31, which contains no reducing agent, exhibits marked discoloration of the background. Plaintiffs’ Exhibit 33, which contains sodium thiosulfate in the background, exhibits practically no discoloration at all.

The COURT: What is the purpose of the lines in this exhibit?

“A. That is the print, your Honor. That is the color that is developed after exposure by application of the developing solution. This paper was exposed under a tracing to light; the portions to which the light penetrated, through the transparent portions of the tracing, were bleached out and when the tracing was removed I developed it with the developing solution and obtained this color where the sensitized paper had been protected from the light by the lines of the tracing.

“Q. And the discoloration is on the part not covered by the lines?

(Testimony of Hugo Klein.)

“A. The discoloration is in the part not covered by the lines in the tracing, yes.

Mr. HOFFMAN: “Q. Will you please produce for the inspection of the Court a specimen of a positive diazo type print which contains both thiourea and sodium thiosulfate therein?

“A. I have one here.

Mr. HOFFMAN: I offer in evidence a specimen of a diazo type print which contains both thiourea and sodium thiosulfate as Plaintiffs’ Exhibit 34.

Mr. WHITE: I have no objection, your Honor, but I think the foundation ought to be laid first that he made these prints before they are offered in evidence.

Mr. HOFFMAN: I think the foundation has been laid. [186]

The COURT: Yes, I think so.

(The specimen was marked “Plaintiffs’ Exhibit 34.”)

Mr. HOFFMAN: “Q. Will you please describe how Plaintiffs’ Exhibit 34 was made?

“A. I made Plaintiffs’ Exhibit 34 by sensitizing a paper with a solution containing 2 per cent. of a diazo compound known as para-diazo-diphenylamine, .75 per cent. oxalic acid, the oxalic acid being added merely to stabilize the diazo compound in the layer prior to exposure, and 2 per cent. of thiourea. I then exposed the sensitized paper under a tracing having opaque lines like this; after the exposure was complete the portion between the

(Testimony of Hugo Klein.)

opaque lines was bleached out by the light, the diazo compound having decomposed on exposure to light. I then developed this latent image consisting of yellow lines on the background with a developing solution containing $2\frac{1}{2}$ per cent. of sodium carbonate, $\frac{1}{2}$ per cent. of phloroglucinol, and 4 per cent. of sodium thiosulfate. Immediately after development I dried this print. It is now Plaintiffs' Exhibit 34.

"Q. When was Plaintiffs' Exhibit 34 made and how was it stored?

"A. Plaintiffs' Exhibit 34 was also made on April 16, 1934, namely, the same day on which I made Plaintiffs' Exhibits 30, 31, and 33. I stored it under exactly the same conditions as I stored the other three exhibits.

"Q. Will you please compare Plaintiffs' Exhibit 34 with Plaintiffs' Exhibit 31, and state what the background shows?

"A. Plaintiffs' Exhibit 31, which contains no reducing agent in the background, either from sensitizing solution or from the developer, shows a very marked discoloration of the background, whereas Plaintiffs' Exhibit 34, which contains in its background thiourea and sodium thiosulfate, shows therein essentially no discoloration whatsoever.

"Q. Mr. Klein, if you take the defendant's paper and developer [187] as analyzed by you and apply or use it according to the directions on defendant's package, Exhibit No. 26, what kind of a finished diazo type will you get?

(Testimony of Hugo Klein.)

“A. You will get a finished diazo type print which has a white background which will remain substantially white for extended periods under normal conditions of storage, and deeply colored lines which will stand out in bold relief on that background.

“Q. Have you made any prints with defendant's paper and developer?

“A. Yes, I have.

“Q. Did you keep them for extended periods of time under the usual conditions of storage?

“A. Yes, I did. I made the prints on November 4, 1932, and I have had them in my filing cabinet in my laboratory since then, and have taken them out from time to time to examine them.

“Q. Did these prints have the characteristics of having a dark image standing out in bold relief on the white background and that the white background was substantially white?

“A. Yes, they did.

“Q. Do you know the practical steps necessary to make positive diazo type prints?

“A. Oh yes, I have made hundreds of them.

“Q. If you took defendant's Diepo paper and its developer, how would you make a positive diazo type print?

“A. I would take the paper and place it under a tracing; I would then expose it to light in such fashion that the light had to penetrate through the tracing to the sensitized face of defendant's paper.

(Testimony of Hugo Klein.)

I would continue that exposure until the yellow diazo compound on this paper had been bleached to a white color in the background of the print, namely, the portion between the lines. When exposure was thus completed I would remove the tracing and I would have a yellow image on a [188] white background. In order to make this yellow image permanent I would develop it with the defendant's developer. I would take some of the defendant's developer powder and dissolve it in water in accordance with defendant's instructions and apply it to the face of the exposed print, preferably in a machine, but it can be done by any obvious means.

“Q. Is this in accordance with the directions of defendant?

“A. Yes, it is.

“Q. In the use of defendant's products, namely, the Diepo paper and developer, according to its instructions, is the light-sensitive layer applied to a base like paper?

“A. It must be applied to a base by somebody, because otherwise it would not give a positive diazo type print.

“Q. Will you explain to the Court the device used by plaintiffs in carrying out the BW process of patent No. 1,841,653, and how it operates, and what it does?

“A. The plaintiffs' process in patent 1,841,653 has to do solely with the mode of applying the developing solution to the face of the exposed print.

(Testimony of Hugo Klein.)

In accordance with this patent I have prepared a diagram here which describes the makeup of the device that we preferably use, or, rather, that we do use for the application of the BW developing solution to the face of our undeveloped BW paper. As you can see by reference to this diagram, this device consists of a feeding table represented here, and a semi-circular trough represented here. This trough contains the BW developing solution. In this trough containing the BW developing solution an applicator roller rotates in counter-clockwise direction. Superimposed on the applicator roller there are a series of contact discs running perpendicularly, which bear down on the applicator roller and rotate in a clockwise direction. On the take-off side of the applicator roller there are a series of take-off [189] devices represented here. The exposed BW paper which as we have mentioned several times before, consists of a faint yellow image on a bleached background, is laid face down on this feeding table, and it is pushed forward in the direction of the arrow until it is seized between the contact discs and the applicator roller. You can see that would be the case, because they are both rotating in the direction of the motion of the paper at this contact point. As the contact discs and the applicator roller seize the paper they tend to draw it through and off the feeding table, here. The applicator roller, rotating as it does in this trough of BW developing solution, carries up some of the BW developing solution on

(Testimony of Hugo Klein.)

its surface. In carrying it up it applies it at this point to the under side of the undeveloped exposed BW paper. At this point right before the contact point a momentary excess of the BW developing solution is applied to the under side of the print, but as the print proceeds between the contact discs and the applicator roller that momentary excess is squeezed out and moves back on the face of the roller in a direction contrary to its direction of rotation; at the immediate contact point between the contact discs and the applicator roller the solution which is still retained between these two rollers is spread over the under side of the paper in the form of a uniformly thin film. The paper, after passing through that contact point, let us say about here, carries with it substantially the quantity of developing solution necessary to effect the complete development of the print, and a slight film of the developing solution is carried back by the applicator roller on this side into the trough. After the print has reached this point it is picked up by this take-off device, which is just a finger that rests there and catches the print as it comes off, and in a moment or two the print is completely developed and completely dried, and undergoes no further treatment. It is then [190] a finished BW print.

“Q. Are you familiar with the developing device sold by defendant for applying the developer to the exposed diazo type print?

“A. Yes, I am.

(Testimony of Hugo Klein.)

“Q. Have you any of defendant’s advertising circulars?

“A. There is one here in court. This represents the so-called no-ink developer which the defendant recommends to be used on its Diepo paper.

Mr. HOFFMAN: I offer in evidence the chart showing the apparatus for use in developing the BW prints as Plaintiffs’ Exhibit 35.

(The chart was marked “Plaintiffs’ Exhibit 35.”)

I offer in evidence defendant’s advertising folder showing device for applying developer as “Plaintiffs’ Exhibit 36.”

(The document was marked “Plaintiffs’ Exhibit 36.”)

“Q. Will you take this advertising folder, Plaintiffs’ Exhibit 36, and explain to the Court how the machine for applying the developer operates, and what it does?

“A. On the fourth side of this folder there is represented in diagrammatic cross section the No-ink developer of the defendant. It consists of a feeding leaf, an applicator roller rotating in a trough, the trough containing the solution of the defendant’s developer, a contact roller superimposed on the applicator roller, and a take-off device. In the use of this machine the exposed diazo type print is laid face down on the feeding leaf and moved forward until it is grasped between the contact roller and the applicator roller, which are rotating, the contact roller rotating in a clockwise

(Testimony of Hugo Klein.)

direction and the applicator roller in a counter-clockwise direction; the applicator roller dipping as it does into the trough containing the developing solution, carries up on its surface some of the defendant's developing solution. Im- [191] mediately to the right of the point of contact between the contact roller and the applicator roller it wets the under side of defendant's exposed paper with an excess of the defendant's developing solution; this excess is, however, immediately squeezed out as the print moves toward the left, the excess draining back contrary to the direction of rotation of the applicator roller into the trough. At the immediate point of contact between the contact roller and the applicator roller the developing solution is spread uniformly over the under surface of the defendant's exposed print. Immediately after the print has progressed to the left past the contact between the contact roller and the applicator roller it has carried with it substantially a quantity of developer necessary to effect complete development of the defendant's print. A slight excess of the developing solution is carried down by the applicator roll on its lefthand side after the print has been removed therefrom by the takeoff device. After the print has been removed by the take-off device it is shortly thereafter completely dried and completely developed, and requires no further treatment. It is then a complete finished Diepo Direcprint positive diazo type.

The COURT: "Q. What becomes of the solu-

(Testimony of Hugo Klein.)

tion that is taken off on the left side; does it fall into the trough at the bottom of the applicator?

“A. The take-off does not take off the solution, it takes off the print.

The COURT: “Q. But there is some solution dripping on the left of the applicator roller as the paper goes through the two rollers, is there not?

“A. Yes. That solution is carried back into the trough and mixed automatically by the motion of the applicator roller with the solution already in the trough. There is a continuous cycle of carrying up the developer and carrying it back. [192]

The COURT: “Q. So the solution is applied both in the trough and at this part, here?

“A. No, your Honor.

The COURT: “Q. What do you call this? You call this the feeding leaf, do you not?

“A. That is just a plain table.

The COURT: “Q. There is no solution there?

“A. No.

The COURT: “Q. The only solution is in the trough?

“A. Yes, in the trough; the roller is rotating in that trough and in so doing it carries up the developing solution, applies it to the bottom face of the print, and some of the solution drains back this way to the right and some of it drains to the left back into the trough and is re-used.

(Testimony of Hugo Klein.)

“Q. In your description of your analysis of defendant’s sensitized paper you testified that you had heated thiourea to 140 to 160 degrees Fahrenheit: Is that correct?

“A. The temperature is correct; I may have testified to that effect, but it should have been centigrade for the obvious reason that when I concentrated the extract here, and I am now referring to Plaintiffs’ Exhibit 29, I was very careful to see that the temperature should not exceed 105 degrees centigrade. Here, again, I made the same effect, and once again at this point I made the same effect. 105 degrees centigrade is approximately equivalent to 220 degrees Fahrenheit. So that obviously it would be foolish to say that there I heated to 140 to 160 degrees Fahrenheit when I had already done so here, and here, and here. So the proper answer should have been 140 to 160 degrees centigrade.

“Q. Did you, yourself, make Plaintiffs’ Exhibit 34?

“A. Yes, I made that myself.

“Q. Will you please compare defendant’s process for applying the developer by the device shown in the advertising folder, [193] Exhibit No. 36, with the BW process of patent 1,841,653, using Plaintiffs’ Exhibit No. 35.

“A. Referring to the fourth page of plaintiffs’ Exhibit No. 36, the right-hand diagram, you will see on Defendant’s diagram of his No-ink developing machine that in principle it is exactly the same

(Testimony of Hugo Klein.)

as plaintiff's machine. They both have a board on which the exposed paper is placed before it is developed. The plaintiff calls for a feeding table, the defendant calls for a feeding leaf. They each have a trough containing the developing solution. In the plaintiff's case it contains the plaintiff's BW developing solution; in the defendant's case it contains the defendant's Diepo developing solution. They each have an applicator roll rotating in that trough of solution shown both in Exhibit 36 and in Exhibit 35. They each have a contact device which the plaintiff calls contact discs and which the defendant calls contact roller, superimposed on the applicator roller. They each have a take-off device which is essentially similar both on Exhibit 35 and in the diagram Exhibit 36. In operation, the print is in each case placed on the feeding table or the feeding leaf, according to what it is called; the print is placed face-down on both of them and pushed forward on the feeding table or on the feeding leaf until it is grasped between the contact discs and the applicator roller in the case of Plaintiff's Exhibit 35, and between the contact roller and the applicator roller of plaintiff's Exhibit 36. In the case of the plaintiff's device the applicator roller carries up BW developing solution; in the case of the defendant's device the applicator roller carries up Diepo developing solution. In the case of the plaintiff's device at the moment the print is grasped between the contact disc and the applicator roller of Exhibit

(Testimony of Hugo Klein.)

35 it is wetted on its under side with BW developing solution. In the case of the de- [194] fendant's No-ink developer at the moment the Diepo print is grasped between the contact roller and the applicator roller it is wetted on its under side with a momentary excess of defendant's Diepo developing solution; the momentary excess of the BW developing solution which is applied in the plaintiff's device drains back in a direction opposite to the rotation of the applicator roller, and on the defendant's device the momentary excess of defendant's Diepo developing solution also drains back contrary to the direction of rotation of the applicator roller of the defendant's device. The plaintiff's device at the immediate point of contact between the contact discs and the applicator roller when the paper has reached that point the plaintiff's BW developing solution is spread uniformly over the under surface of the plaintiff's BW paper; in the defendant's device the defendant's Diepo Direcprint developing solution is similarly spread over and under side of defendant's Diepo paper. In the plaintiff's device, after the paper has passed the contact point of the contact discs and the applicator roller it has been wetted with substantially the proper quantity of the plaintiff's BW solution which is necessary to effect the complete development of the plaintiffs' BW print. Similarly, in the defendant's device, the paper immediately after passing the contact point between the contact roller and the appli-

(Testimony of Hugo Klein.)

cator roller of Exhibit No. 36 has been wetted with substantially the proper quantity of the defendant's Diepo developing solution required to effect complete development of the defendant's Diepo print. In both cases the prints, after having passed the contact point, are taken off by means of take-off devices which are relatively unimportant items of the machine, merely being there for the purpose of taking the print off after it has been developed. After the print has passed the take-off device in each case it takes merely several moments for it to [195] dry. In the plaintiffs' case the BW print is complete; in the defendant's case the Diepo print is complete. Neither of them require any further treatment.

“Q. In summary, would the operation of defendant's developing apparatus, when operated with defendant's paper and developer, be similar to or different from the operation of plaintiff's device with plaintiff's paper and developer?

“A. No; the operation of the two devices run exactly parallel. point for point.

“Q. Will you please state whether thiosulfate is not decomposable by alkali and, if so, explain your reasons for so stating.

“A. No, thiosulfates are not decomposable by alkali. My reason for so stating is that I have actually determined this point in my laboratory. I took sodium thiosulfate, which is the most common thiosulfate, and dissolved it in water and——

(Testimony of Hugo Klein.)

Mr. WHITE: If the Court please, I will stipulate that thiosulfate is not decomposable by alkali. I will stipulate to that.

Mr. HOFFMAN: Defendant has admitted that it has practiced a process, after receipt of notice of infringement, in which a sensitized paper and developer were used, the paper and developer being of the same chemical composition as the sensitized paper, Direcprint paper No. 500, and the developer therefor, sold by defendant to plaintiff on October 24, 1932. Defendant has further admitted that it has practiced the process for applying this developer to the exposed surface of a diazo-type print in the manner which we claim is within the second Van der Grinten patent in suit——

Mr. WHITE: Just a moment please, Mr. Hoffman. If the Court please, the way plaintiffs' counsel has presented that it would appear to the Court that defendant has stipulated to everything counsel says. The last portion of his statement, saying "in the manner which we claim is within the second Van der [196] Grinten patent in suit," that is not stipulated to.

The COURT: I understand that that portion is his own view.

Mr. WHITE: Yes, it is his view, not our stipulation.

Mr. HOFFMAN: I would therefore like to read the portion from the interrogatories propounded by plaintiffs and the defendant's answer thereto, Plain-

(Testimony of Hugo Klein.)

tiffs' Exhibit No. 6, being Interrogatory No. 7 and the answer to said interrogatory, which contains these admissions. If the Court prefers, I shall just call attention to this interrogatory and the answer to it, or I would prefer that the reporter would copy it into the record, so that the record will be complete.

The COURT: I want to know now what the interrogatory and the answer are.

Mr. HOFFMAN: It is Interrogatory No. 7.

The COURT: Perhaps I didn't understand you. Did you suggest that you give the substance of it, or that you will read the complete interrogatory and the answer?

Mr. HOFFMAN: Either I will read it into the record or else have the reporter copy the complete interrogatory and answer into the transcript.

The COURT: I want to know now what they are.

PLAINTIFFS' INTERROGATORY No. 7
AND DEFENDANT'S ANSWER ARE REPRODUCED
HERE BELOW BECAUSE THE COURT DIRECTED
THAT SUCH INTERROGATORY AND ANSWER BE
READ IN FULL AT THE TIME REFERENCE WAS
MADE THERETO.

“State whether after the receipt of the notice of infringement, dated September 16, 1932, you have practiced a process for making direct positive diazo type prints in which a sensitized paper and a de-

(Testimony of Hugo Klein.)

veloper was used the said paper and said developer being of the same or substantially the same chemical composition as the sensitized paper designated by the trade name 'Direcprint paper No. 500' and developer therefor, sold by [197] you to plaintiff on October 24, 1932. If so,

“(a) Describe in detail how such process was carried out.

“(b) Name the specific ingredients or chemical compounds contained in the sensitized layer of the sensitized paper used.

“(c) Name the specific ingredients or chemical compounds contained in the developer used.

“(d) Describe the specific manner in which the developer was applied to the exposed prints.”

The answer to interrogatory No. 7 is as follows:

“The defendant has, after the receipt of the notice of infringement dated September 16, 1932, practiced a process for making direct positive diazo-type prints in which a sensitized paper and a developer were used, the said paper and said developer being of the same or substantially the same chemical composition as the sensitized paper designated by the trade name 'Direcprint Paper No. 500' and the developer therefor, sold by defendant to plaintiff on October 24, 1932.

“(a) The process above referred to has been carried out with a number of different machines and, in general, consists of the following steps:

(Testimony of Hugo Klein.)

“Sensitized paper, designated by the trade name ‘Direcprint Paper No. 500’, which has been cut to required size in accordance with the tracing or drawing to be reproduced, is exposed to light under the transparent tracing or drawing and is in contact therewith for a predetermined period of time. The latent image impressed upon the sensitized paper as a result of the exposure to light is then developed out by passing the paper through a developer similar to that sold to plaintiffs on October 24, 1932.

“The developing step of the process originally was carried out by defendant, early in 1930, with a so-called ‘hand machine.’ This machine comprises a framework supporting a [198] trough in which the developer is contained and also supporting an idler roller partially immersed in the developer. The exposed sensitized paper is fed to the roller manually and passes through the developer to be gripped and pulled therefrom manually. The print is fully developed immediately and the print dries relatively rapidly.

“The above machine was discarded in a few months and in the late spring of 1930 defendant used a machine known commercially as the ‘Safir-developing Machine A.L.’ for the developing step of the process. The ‘Safir’ machine is, in general, similar to the so-called ‘hand-machine’ except that the roller is power driven and, further, take-off members are provided adjacent the roller for releasing the paper from the roller or, in other words, for pre-

(Testimony of Hugo Klein.)

venting the paper from adhering to the roller and repeatedly passing through the developer.

“Later, say in the late summer of 1930, the ‘Safir’ machine was discarded and defendant commenced and is still using a machine commercially known as the ‘Paragon Revolute No-Ink Printer.’ A pamphlet of the Paragon Revolute Corporation, in which this machine is illustrated, is annexed hereto and made a part hereof. As illustrated, the machine comprises a framework supporting a trough in which the developer is carried. An inverted container for supplying developer to the trough is mounted at one end of the framework. The machine also includes a power-driven applicator roller partially immersed in the trough together with a power-driven contact roller supported above the applicator roller. The paper is fed between the rollers and receives a film of the developer from the applicator roller as it passes through the two rollers.

“(b) Inasmuch as defendant is but a wholesale and retail dealer in and does not manufacture the sensitized layer of or [199] the sensitized paper used in the aforementioned process, defendant has insufficient knowledge to and cannot answer as to the matter inquired about in subdivision (b) of Interrogatory No. 7.

“(c) Inasmuch as defendant is but a wholesale and retail dealer in and does not manufacture the developer used in the aforementioned process, defendant has insufficient knowledge to and cannot

(Testimony of Hugo Klein.)

answer as to the matters inquired about in subdivision (c) of Interrogatory No. 7.

“(d) The specific manner in which the developer was applied to the exposed prints by the defendant is set forth in sub-paragraph (a), supra, of this Answer to plaintiffs’ Interrogatory No. 7.”

Mr. HOFFMAN: Now, your Honor, for the sake of the record, I would like to state that the exhibit referred to in this answer to Plaintiffs’ Interrogatory No. 7 is plaintiffs’ Exhibit No. 36.

Cross Examination.

“Q. Referring now to Plaintiffs’ Exhibit 29, the chart showing your analysis of defendant’s paper, will you state whether or not that chart indicates an analytical method of isolating thiourea?”

“A. Yes, it does.

“Q. That was your purpose in conducting that experiment?”

“A. Yes.

“Q. Now, referring to Plaintiffs’ Exhibit No. 32, the analysis of defendant’s developer, will you state whether or not that chart indicates an analytical method of indicating the presence of sodium thiosulfate in the substance or in the compound?”

“A. No, not a sodium thiosulfate, but of a thiosulfate.

“Q. Of a thiosulfate?”

“A. Yes. [200]

(Testimony of Hugo Klein.)

“Q. It merely shows the presence or existence of the thiosulfate compound?

“A. Yes.

“Q. I would like to have you refer to Plaintiffs’ Exhibits 30, 31, 33, and 34 which represent prints which have been testified to that you made.

“A. Yes.

“Q. Now, with specific reference to Plaintiffs’ Exhibit 30, will you please state whether or not the background of the print shown on this exhibit was of that color at the time you made this exhibit originally?

“A. You mean the color it is now?

“Q. The present color.

“A. No. Immediately after I made the print it was white.

“Q. Can you produce in court a sample of a print containing the substance thiourea showing a background different in color than the background which is shown in the print in this exhibit?

“A. I do not quite follow what you mean.

“Q. You stated just previously that the background of this print immediately after its development was white or a little lighter than it is.

“A. Yes.

“Q. Can you produce such a print in court?

“A. No, I cannot.

“Q. In other words, it is your testimony that immediately after this print is developed the background is whiter than it is now exhibited in this

(Testimony of Hugo Klein.)

print on this exhibit?

“A. Yes.

“Q. Then there has been a discoloration of this print, that is, discoloration of the background of this print?

“A. There has been a slight discoloration, yes.

“Q. And thiourea is present in it? [201]

“A. And thiourea is present in it.

“Q. Now, referring to Plaintiffs' Exhibit 31, on which is shown a specimen of a print made from a sensitized paper, and developer, in which there was no reducing agent used, either in the paper or developer, will you please state to the Court whether the background of the print shown in that exhibit was the same color as it now is immediately after it was made?

“A. No. Immediately after this print was made it was not the same color as it is now, the background.

“Q. The background, then, has discolored somewhat?

“A. Yes, it has.

“Q. In other words, in both cases the print exhibited in Plaintiffs' Exhibit 30 and the print exhibited in Plaintiffs' Exhibit 31 has a background which has discolored?

“A. Yes, but the exhibit containing the thiourea has discolored much less than the one which does not contain thiourea.

(Testimony of Hugo Klein.)

“Q. Now, referring to Plaintiffs’ Exhibit 33, showing a specimen of a print made with a sensitized paper and developer containing sodium thio-sulfate, will you please state to the Court whether the background of that print was of the same color as it is now, that background of the print which was of the same color immediately after it was made as it is now?

“A. Well, it is difficult to remember since April of this year, when these prints were made, exactly how the background looked after it was made, but I would say in this sample there is a very slight discoloration.

“Q. At all events, there has been a discoloration?

“A. Yes.

“Q. A reducing agent is present in that finished background, is it not?

“A. Yes.

“Q. Now, referring to Plaintiff’s Exhibit 34, in which you [202] show a specimen of a print with a sensitized layer containing a reducing agent, specifically thiourea, with a developer containing a reducing agent, specifically sodium thiosulfate, will you state to the Court whether or not the background of that print immediately after it was made was of the same color as now appears on that exhibit?

“A. Once again, in similar fashion to the answer to the previous question, I would say that in

(Testimony of Hugo Klein.)

the absence of a direct comparison there probably has been as light discoloration, but practically none at all.

“Q. But at all events there has been a slight discoloration of the background of the print, Plaintiffs’ Exhibit 34, even though we have present in the background two reducing agents, namely, thiourea and sodium thiosulfate?

“A. A very slight discoloration.

“Q. Now, with respect to these exhibits to which you have just referred, you stated that you made these on or about April 16, 1934, and they were kept in your desk.

“A. Yes.

“Q. Or in a file and brought out from time to time and laid on the desk?

“A. That is right.

“Q. Is it your testimony that that is the normal use of a diazo print?

“A. Well, there are always exceptions to any rule, but from my observation of the way people use these diazo type prints it would appear that that method of storage is at least a very close approximation to the normal method of storage.

“Q. Isn’t it a fact, Mr. Klein, that engineers, architects, surveyors, men out in the field, use these diazo direct prints right out in the field to refer to?

“A. They probably do. [203]

“Q. Then is it your testimony that the normal use of these diazo direct prints would be used in the field?

(Testimony of Hugo Klein.)

“A. No, that would be one method of common use.

“Q. In other words, one normal use would be what you might say was the storage where they would be kept in a desk, or drawer to be referred to by clerks in the office?

“A. Yes.

“Q. And another normal use would be a use out in the field?

“A. Yes.

“Q. Where they are exposed to sunlight.

“A. Yes.

“Q. Have you ever made a comparison between a diazo direct print which was kept in a desk or in an office on a desk and a print that was used in the field by a surveyor, for example a bridge contractor?

“A. Yes, I have.

“Q. What is your conclusion with respect to the discoloration of the background of the diazo direct print that has had those two types of use; in other words, one made to keep in the office, one copy, an office copy, and the second copy has been taken out in the field and used?

“A. Obviously, when a print is taken out of the files in the office and taken out in the field it is subject to much more reaction of the atmosphere than is the case with the print which is filed in the office, and as the oxidation action is the one that causes the discoloration the print which had been out in the

(Testimony of Hugo Klein.)

field and exposed to air for a comparatively long time as compared with a print on file will show more discoloration than the print that has been kept in the office on file.

“Q. But at any rate the prints which are used in the field are used under normal conditions, are they not? [204]

“A. No. I think of the BW prints that we make, a very small percentage of them are used out in the field that way.

“Q. In your direct examination, Mr. Klein, you testified that you made an analysis of the defendant's developer.

“A. I did.

“Q. When was this analysis made?

“A. As nearly as I can remember—of course, I did not make the whole examination at one time.

“Q. No, I appreciate that, but approximately when did you make that examination.

“A. In November, 1932, I will say:

“Q. Have you made any other analysis of that developer?

“A. Yes, I have.

“Q. During what period of time?

“A. Subsequent to November, 1932.

“Q. Was the analysis that you made subsequent to 1932 an analysis of the same developer, or part of the same developer which was in the container forwarded to you from your Los Angeles office?

“A. Yes.

(Testimony of Hugo Klein.)

“Q. So you don’t know today whether one month before this trial, or even six months, or even a year and a half before the commencement of this trial, the defendant’s developer contained any reducing agent of any character, did you, and you cannot testify to that?

“A. No, I don’t know that.

“Q. And the same testimony is true with respect to the defendant’s paper, is it not?

Mr. HOFFMAN: Your Honor, I object to this line of questioning, because as to what has been done since the suit was started is immaterial and irrelevant.

The COURT: Overruled; an exception. [205]

“A. By the same you mean that I have made no analysis of any samples later than what I received on November 1, 1932?

“Q. That is what I mean.

“A. That is true.

The COURT: That is the effect of the direct testimony, the sample from which these tests were made was brought in October, 1932.

“A. Yes, and I received it on November 1, 1932.

The COURT: “Q. The inference from that testimony is that you purchased no other samples of the defendant’s paper or developer.

“A. Yes.

“Q. Now, I would like to go back to the first patent in suit for just a moment, with particular

(Testimony of Hugo Klein.)

reference to Claim 7, Claim 8, Claim 16, and Claim 25; Claim 7, being at the bottom of page 5 of the patent, recites a process the first step of which is applying a diazo compound to a base; is it your testimony that the defendant company applies a diazo compound to a layer or a base?

“A. That I cannot say, because I have not access to the defendant’s factory. The paper that I received on November 1, 1932, had a light-sensitive layer.

“Q. Yes, we have stipulated to that. The first step of the process defined in Claim 8 is similar to the first step of the process defined in Claim 7, because it incorporates it in Claim 8: Is that not correct?

“A. Yes.

“Q. The first step of the process defined in Claim 16 is similar to the first step of the process defined in Claim 7?

“A. Yes.

“Q. Likewise, the first step of the process in Claim 25 is exactly the same as the first step recited in Claim 7: Is that not true? [206]

“A. In each case you are specifying the portion that reads ‘which comprises applying to a base a layer containing diazo compound,’ etc?

“Q. Yes, that is what I am referring to.

“A. Yes.

“Q. In other words, it is your testimony that in each of these claims that first step to which you have just referred is in the same words?

(Testimony of Hugo Klein.)

“A. Yes.

“Q. And as you have previously stated, you do not know whether the defendant company practices that first step of the process defined in those claims?

“A. No, I do not.

“Q. At what date or period did you bring out the new BW machine which is illustrated in Plaintiffs' Exhibit No. 35?

“A. I cannot say, because ever since we first began to market the BW process, the BW paper, the BW developer, and the BW developing machine we have been making improvements, not only on the paper and the developer, but on the machine. There is no clear-cut line of definition as between these machines; we would add the improvements as we brought them out.

“Q. Does it make any difference, in your opinion, whether or not a developer containing merely one ingredient, say an azo dye component, or whether that developing liquid would contain, say, three ingredients, for instance, azodyestuff component, a reducing agent, and a non-volatile alkaline, my question is would it make any difference in the actual application of that developing liquid to the surface of a diazo-sensitive layer in so far as the operation of the machine is concerned which is exhibited in Plaintiffs' Exhibit No. 35?

“A. You mean in the actual mechanical operation of the machine, do you? [207]

(Testimony of Hugo Klein.)

“Q. Does it make any difference what the composition of the developing liquid is in so far as the actual operation of the machine is concerned?

“A. No, it does not.

“Q. In other words, that machine will place a thin film of practically any type of a developer on a diazo sensitive layer, will it not?

“A. Yes, it will.

Redirect Examination

Mr. HOFFMAN: “Q. In your cross-examination, Mr. Klein, you stated that one of the known conditions of storage was having prints out in the field and exposed to the sun.

“A. Yes.

“Q. Is that the usual situation, that these prints are used under?

“A. No, I would say that is the exception rather than the normal way of using these prints.

“Q. So that that is an abnormal condition?

“A. Yes.

“Q. Under the most favorable circumstances after the prints are made, say for instance, prints are made and are kept either on a desk or in a desk drawer, or in a filing cabinet, and you take them out periodically in the manner you previously have testified about, would these diazo-type prints show any discoloration whatsoever after an extended period of time?

“A. They would show practically no discoloration.

(Testimony of Hugo Klein.)

“Q. Would it be slight?

“A. Very slight.

“Q. So, in other words, diazo-type prints that had this reducing agent in the background do show very little discoloration after they have been made and stored for extended [208] periods?

“A. Yes, they do.

“Q. If you make diazo-type prints that do not have thiourea or thiosulfate, or any reducing agent of that type that prevents discoloration, do they show any discoloration after they have been made for several months under normal conditions of storage?

“A. They show a very marked discoloration in the background.

“Q. Then positive prints that have been made in which there is a reducing agent in the background of the finished print show very little, or practically a very slight discoloration after a long-extended period of storage: Is that correct?

“A. That is true.

“Q. Then the diazo-type prints that have this reducing agent in the background, like thiourea or thiosulfate, show a marked improvement over the others that have no reducing agent?

Mr. WHITE: I object to the question your Honor, just in one slight respect, counsel has used the words “these reducing agents like thiourea”—sort of planting in the witness’ mind that thiourea is a reducing agent.

(Testimony of Hugo Klein.)

The COURT: Objection overruled; exception.

“A. Yes, they show a marked improvement.

“Q. With regard to applying the sensitive layer to the paper, is this layer built into the paper, or is it just put on top of the paper, or how is that done?

“A. It is applied to the top of the base paper.

“Q. Then in other words, somebody has to put it on there?

“A. Certainly.

Recross Examination

“Q. But you do not know whether the defendant applies a diazo sensitive layer to a base, do you?

[209]

“A. I could hardly be expected to know that.

“Q. Mr. Klein, will you please refer to the first patent in suit, page 2, lines 56 to 61 inclusive, and read that statement to the Court?

“A. ‘The invention is based on the observation that the discoloration of the background in all kinds of diazo-type processes can be prevented even for extended periods if a reducing agent is added to the sensitive layer, or during or after development of the picture.’”

“Q. You have previously testified that diazo-type prints made with substances like thiourea and sodium thiosulfate in the background show a discoloration.

“A. They show a very slight discoloration.

(Testimony of Hugo Klein.)

“Q. The discoloration is not prevented then, is it?

“A. No; it is prevented for a certain period.

“Q. What would you say would be an extended period of time?

“A. That depends upon the conditions of storage, the number of times the print is exposed to the atmosphere, etc. There is nothing definite about that; it is an indefinite period.

“Q. Is it not a fact that the diazo-type print was brought onto the market in the United States to be used parallel with the blueprints which we have been making in this country for many years?

Mr. HOFFMAN: I object to this line of questions, your Honor, because we did not touch on blueprints at all in the direct examination of this witness.

The COURT: Objection overruled; exception.

“A. May I ask you what you mean when you say ‘parallel’?

“Q. In the same type of work. Blueprints are used in the construction game, they are used out in the field by engineers, surveyors, and the like, are they not?

“A. Yes. My answer to that question would be this, that [210] blueprints have their field and diazo-type prints have their field; the two fields of use coincide in some respects. There are certain uses that blueprints serve preeminently and there are other uses that diazo-type prints serve preeminently.

(Testimony of Hugo Klein.)

“Q. An engineer on a bridge job, for instance, at the Golden Gate Bridge, or at the Oakland Bay Bridge, would take the diazo-type print along with him to the job and would have it exposed to the sunlight in referring to it, would he not?

“A. Yes, if he took a diazo-type print with him he would expose it to the light.

“Q. Just the same as the blueprint would be exposed to the light.

“A. Yes.

“Q. They are used practically in the same way, are they not?

“A. I answered that question before. [211]

TESTIMONY OF ARTHUR LAZAR FOR DEFENDANT.

Arthur Lazar, called as a witness on behalf of defendant, being duly sworn testified as follows:

Direct Examination

My name is ARTHUR LAZAR. I am 45 years old; and reside at Concord, California. I am research chemist, having had altogether 37 years' experience counting my school days and college years.

I attended the University of Berlin for six years, and obtained my chemical degree and Ph. D. from that university in 1912. From 1912 up to April,

(Testimony of Arthur Lazar.)

1914, I was assistant to Professor Emil Fisher in chemistry at the University of Berlin. After that time I entered industry in Germany as a research chemist. In 1927 I came over to this country and have been active since as a research chemist.

Since about April, 1933, I became interested with the manufacture of diazo types. I have studied and have familiarized myself with the contents of the two patents in suit.

“Q. I now hand you Defendant’s Exhibit C, being United States patent No. 1,444,469, issued to Kogel, and ask you state to the Court whether or not you have studied this patent and are familiar with the subject-matter contained therein.

“A. Yes, I have.

“Q. Do you find anywhere in that patent a substance which is a reducing agent?

“A. Yes. I see in Example 3 on page 2 there is mentioned 20 parts by weight 1-diazo-2-oxynaphthalene-4-sulphonic acid and 5 parts by weight tartaric acid are dissolved, etc.

“Q. What is the substance that is a reducing agent in that example? [212]

“A. Tartaric acid.

Mr. HOFFMAN: Your Honor, I object to this. The patent they are testifying about is exactly the duplicate of British patent No. 210,862, Plaintiffs’ Exhibit 20. You will recall that during our direct examination we discussed this British patent at length; during the cross-examination this patent was

(Testimony of Arthur Lazar.)

gone into at extreme length. If I may refer to the British patent and this patent that he is now referring to I can show that the examples are identical and the subject-matter is identical. This patent is exactly the duplicate of it. This would be merely taking up the Court's time and duplicating testimony which has already been had in respect to this.

Mr. WHITE: I have only three or four more questions to ask on it, your Honor.

The COURT: Objection overruled; exception.

"Q. On page 1 of this patent, at line 78, it is stated, is it not 'To obtain still greater stability of the light-sensitive layer small additions of acid such as tartaric or citric acid are made.'

"A. Yes, it is.

"Q. Assuming that you made a diazo sensitive layer containing citric acid, one of the substances named by Kogel, and you develop that layer with sodium carbonate, a non-volatile alkali, will you please tell the Court whether or not a reducing agent would be present in the finished print made from such development, and if so, please state what the reducing agent was.

"A. Yes, there would be sodium citrate left in the finished print.

"Q. I now hand you a copy of the second patent in suit, No. 1,841,653, and ask you to refer to Example 2 stated on page 3, lines 38 to 54 inclusive, and referring specifically to lines 50 to 54, inclusive, of that example, tell the Court [213]

(Testimony of Arthur Lazar.)

whether or not a reducing agent is mentioned in that example.

“A. The patent states here: ‘An entirely black picture is obtained, which is very stable against any tendency to become yellow, which would not be the case without the reducing means (citrate, hypsulphite and glucose).’

“Q. The patentee is referring, is he not, to sodium citrate just above that portion which you have just read?

“A. Yes, he says on line 47, ‘10% of sodium citrate.’

“Q. Sodium citrate is a reducing agent, is it not?

“A. Yes, it is.

“Q. I now hand you a copy of the Gronau patent, Defendant’s Exhibit D, and ask you to tell the Court what is disclosed in that patent.

“A. The patent claims cover a process for developing light-sensitive layers characterized by the fact that the paper to be developed is guided along a belt moistened with breath-thin layer of the developer liquid and moving upon a common carrier.

In claim 2 it covers the equipment to carry out said process.

“Q. In your opinion Doctor, would the apparatus which is disclosed in the Gronau patent, Defendant’s Exhibit D, function to impress a thin film of a developer upon a diazo sensitive layer?

“A. Yes, it could.

(Testimony of Arthur Lazar.)

“Q. In other words Doctor, the Gronau disclosure is for an apparatus for impressing a breath-like or thin film of a developer upon a diazo layer: Is that not right?

“A. Yes, that is correct.

“Q. I now hand you a copy of the second patent in suit, and ask you to refer to and read to the Court claim 1 of that patent.

“A. Claim 1 reads as follows: ‘The process for developing direct [214] positive diazo prints which consists in impressing upon the surface to be developed an alkaline liquid containing an azo-dye-stuff component and a reducing agent non-decomposable by alkali, in the form of a uniformly thin film.’

“Q. Is it your opinion that the apparatus which is described in the Gronau patent could impress a thin film of developer of the character specified in this claim to which you have just referred and read?

“A. Yes, I believe so, because it is stated in the claim that a thin film is applied.

“Q. And the only distinction between the recital of the claim 1 of the second patent and the Gronau disclosure is, is it not, that Gronau does not specify the ingredients of his developer liquid: Is that not correct?

“A. Yes, it is.

“Q. But in the United States Letters Patent to Kogel which you have in your hand, Defendant’s

(Testimony of Arthur Lazar.)

Exhibit C, there is disclosed is there not, a developing liquid containing a non-volatile alkali, together with an azodyestuff component?

“A. Yes, there is.

“Q. Will you read to the Court that portion of the Kogel patent wherein that disclosure is made, and specify the page and line number, if you will, please.

“A. In example 9 there is specified that the development may also be effected on a bath containing 2.5 parts by weight resorcinol and 5 parts by weight of cupric sulphate dissolved in 80 parts water. That is on page 8, lines 59 to 65. On page 2 in Example 2, lines 122 to 126, it is said:

“The diazo paper can also be immediately treated before use with alkali. After the exposure the picture is washed in diluted sodium hydrate solution.”

“Q. What is the reducing agent that is specified in the Kogel [215] patent?

“A. Tartaric acid.

“Q. Would it make any difference, in so far as the presence of that reducing agent in the finished print whether or not the tartaric acid were included in the diazo layer, or whether it were included in the development?

“A. It would make no difference. The salt of tartaric acid is present in the finished print, regardless of whether it was applied before or after the development.

“Q. You just testified, did you not, that the Kogel patent discloses a developer containing an azodyestuff component?

(Testimony of Arthur Lazar.)

“A. It does.

“Q. Now Doctor, having in mind the fact that diazo types made in accordance with the Kogel disclosure and using citric acid in the developer as well as azodyestuff component, and also having in mind the disclosure of the Gronau patent, do you feel that it would be possible to impress a thin film containing an alkali, an azodyestuff component, and a reducing agent non-decomposable by alkali, such as citric acid, on a diazo layer with the Gronau apparatus?

“A. Yes, I think that is possible.

“Q. With respect to all of the claims of the second patent, regardless of the composition of the developer, Gronau's apparatus functions to impress a thin film of any type of developer upon a diazo layer, does it not?

“A. Yes, it does.

“Q. Doctor, is the substance known as thiourea present in the developer sold by the defendant company?

“A. Yes, it is.

“Q. Is thiourea a reducing agent?

“A. No, it is not a reducing agent.

“Q. I now hand you Plaintiffs' Exhibit No. 11, being the [216] original German script and the translation thereof of the article of C. Rathke, published in Volume 1 of the January to June 1884 *Berichte*, covering pages 297 to 309, and ask you to what that paper relates.

(Testimony of Arthur Lazar.)

“A. This paper describes certain components formed by the inter-action of thiourea with metal salts.

“Q. Have you read and studied that paper, Doctor?

“A. Yes, I have.

“Q. As a matter of fact, you translated the German into the English did you not?

“A. Yes I did.

“Q. Are the words ‘reducing agent’ or ‘reduction’ mentioned at any place in that paper?

“A. No, they are not mentioned.

“Q. Is thiourea defined as a reducing agent in that paper?

“A. No, it is not.

“Q. You have been in Court during the direct and cross-examination of Dr. Van der Grinten, have you not?

“A. Yes, I have.

“Q. Do you recall that during Doctor Van der Grinten’s testimony he said that when a reducing agent performed its function the reducing agent, itself, undergoes oxidation?

“A. Yes, I remember that.

“Q. By reading Rathke’s article do you find any evidence that oxidation products of thiourea are formed and found among the reacted products obtained by reacting thiourea with the metal salts?

“A. No, I cannot find any evidence of that.

“Q. Will you please state what reaction products are formed according to Rathke when cupric salts and thiourea are brought together?

(Testimony of Arthur Lazar.)

“A. According to Rathke there is formed a white precipitate which [217] he, himself, states on page 1 of his treatise are complex compounds of thiourea with the metal, in which the metal has entered the thiourea complex; he says on the first page of his treatise that the subject-matter of this paper relates to some combinations of thiourea with inorganic salts which are of particular interest because from them it may be shown that they do no longer contain this salt as such, but that the metal has entered the urea complex and that the latter one then has combined with the acid.

“Q. You have previously testified, have you not Doctor, that no oxidation products are formed or found among the reaction when thiourea is reacted with the cupric salts, according to Rathke’s publication?

“A. According to Rathke’s own statement of what the reaction compound constitutes, there is no evidence found that there are oxidation products of thiourea.

“Q. Does Rathke mention in his article on metal salts and reaction between thiourea other metal salts besides cupric salts?

“A. Yes, he refers to other metal salts, for instance silver salt, and mercury.

“Q. Where do you find any reference to those salts?

“A. On pages 8 and 9.

(Testimony of Arthur Lazar.)

“Q. Doctor Lazar you previously testified, did you not, that no oxidation products are formed or found among the reaction products obtained when thiourea is reacted with cupric salts.

“A. Yes, I did.

“Q. Has Rathke mentioned in his article on metal compounds the reaction between thiourea and other metal salts besides the reaction with cupric salts?

“A. Yes, he speaks of the reaction with silver salts and mercury salts.

“Q. I hand you Plaintiffs’ Exhibit 10, which is the article we [218] are now discussing, and ask you to point to that portion of the article which refers to mercury salts, and also to what Rathke says about the reaction between thiourea and mercury salts.

“A. At the bottom of page 8 he says: “However, it might now be argued that the cuprous salts perhaps would react alkaline if it were at all possible to bring them in solution. However, I have convinced myself that also the compounds of the thiourea with the salts of several other heavy metals react strongly alkaline, for instance, those with silver chloride and even those with mercuric chloride, which in itself however, reacts acid.” In the footnote following this he makes the statement: “In view of the copper compounds, it is probably not superfluous to emphasize explicitly that the above—meaning the mercury compounds—actually

(Testimony of Arthur Lazar.)

contains mercuric chloride and by no means mercurous chloride.”

“Q. In other words, that portion of the paper which you have just read means that Rathke’s analysis of thiourea mercury compound reveals that the relation between mercury and chlorine in the newly formed complex compound is the same as in the original used mercuric chloride, and there is no decrease in the non-metallic part of the mercuric salt; is that correct?

“A. Yes, it is.

“Q. Is there any place in that paper wherein Rathke emphasizes that cuprous chloride is no longer present in the newly formed compound when thiourea is reacted with cupric salt?

“A. Yes, there is. He gives a number of reasons. I would like to read his summarizing statement in that respect.

“Q. What page is that on?

“A. That is on page 9, under point 3; he says in the middle of the page: “This points to at least a strong relation of the urea to the cuprous chloride which is to be formed, whereas the usual double salts”—I beg your pardon, that is not the [219] one I wished to refer to.

“Q. Please read the last sentence under point 4.

“A. “Also, this seems to me to point to the fact that the cuprous chloride is, as such, here no longer really present.”

“Q. Does that statement in effect mean that a reduction of cupric chloride to cuprous chloride

(Testimony of Arthur Lazar.)

cannot be involved in the reaction between thiourea and cupric chloride which is the subject-matter of the Rathke publication?

“A. Yes, it does.

“Q. Is it your conclusion from a careful and considered study of Rathke’s publication that there is no proof to be found in Rathke’s paper that thiourea is a reducing agent?

“A. No, it is not to be found.

“Q. Now will you refer to Plaintiffs’ Exhibit 12, which is a chart setting out the formula of thiourea. That formula is correct, is it not?

“A. Yes, it is.

“Q. Thiourea is also known as thiocarbamide, is it not?

“A. Yes, it is.

“Q. Are you familiar with the formula of carbamide?

“A. Yes.

“Q. How would it look if you set it out on that chart—is it just a simple change?

“A. Carbamide is very closely related to thiocarbamide in as far as it contains an oxygen atom, whilst the thiourea contains a sulfur atom, as indicated by symbol S. S indicates sulfur. It would be an O if it were ordinary urea or ordinary carbamide.

“Q. In other words, carbamide means the same thing as urea, and thiocarbamide the same as thiourea?

“A. Yes.

(Testimony of Arthur Lazar.)

“Q. Do you recall the testimony of Doctor Van der Grinten a couple of days ago on cross-examination when I asked him whether [220] carbamide or urea was a reducing agent?

“A. Yes, I do.

“Q. What did he say in that respect?

“A. As I remember it, he said carbamide was a reducing agent.

“Q. Do you know of any simple test that you could lay before the Court just briefly proving that carbamide or urea is not a reducing agent?

“A. Yes, I could refer to the same test which is brought forth by the plaintiff here to explain reducing action namely, a test between cupric salts and a reducing agent. For instance, in a biological laboratory such a test is conducted every day when urine is tested for glucose, which is a true reducing agent. The chemist who makes the test will use alkaline cupric salts solution and glucose will reduce this alkaline cupric salts solution to cuprous oxide. On the other hand, everyone knows that urea is present in urine, whether the urine is that of a diabetic or of a healthy person. If urea was a reducing agent it would have to interfere with this reaction for glucose, but since this reaction is a well known and well recognized test urea cannot be a reducing agent.

“Q. You have previously testified, have you not, Doctor, that you translated the deposition of Doctor Loevenich, which is in evidence here?

“A. Yes, I did.

(Testimony of Arthur Lazar.)

“Q. And naturally, since you made that translation, you are thoroughly familiar with that deposition are you not?

“A. Yes, I am.

“Q. Do you agree with the statements made therein by Doctor Loevenich, especially wherein he states that thiourea is not a reducing agent?

“A. I remember that statement.

“Q. Do you agree with that statement? [221]

“A. Yes I agree with it.

“Q. Now, returning to the first patent in suit, and with particular reference to claim 1, page 5 of the patent, will you please tell the Court how you would practice the process of that claim?

“A. In order to practice the first claim of this patent I would have to experiment in order to find out which reducing agent would be capable of arresting under normal conditions the discoloration of the components forming the background of the print.

“Q. You would not practice that process unless you obtained that result, that is, a background in a diazo print that did not discolor?

“A. I would not.

“Q. Doctor, that claim specifies a reducing agent, does it not?

“A. Yes.

“Q. Capable of arresting discoloration?

“A. Yes.

(Testimony of Arthur Lazar.)

“Q. Will you kindly tell the Court what type of reducing agents are mentioned in the specifications of this patent, what type or types?

“A. In the specifications of this patent, on page 2, line 56, commencing “The invention is based on the observation that the discoloration of the background in all kinds of diazo type processes can be prevented even for extended periods if a reducing agent is added to the sensitive layer or during or after development of the picture.”

“Q. What is the next sentence?

“A. Preferred reducing agents are organic substances such as aldehydes, amino compounds, aliphatic amido compounds, polyoxy compounds, or the like.”

“Q. Have you read the examples in the patent on pages 4 and 5? [222]

“A. Yes, I have.

“Q. What specific classes or types of reducing agents do the substances set forth in the examples fall within, that is, formaldehyde, what type of reducing agent is that?

“A. All of these reducing agents named in the examples are organic reducing agents.

“Q. Do you find any place in that specification any substance which would fall in the class of an inorganic reducing agent?

“A. No, I do not.

“Q. Is there anything common at all between organic reducing agents and inorganic reducing

(Testimony of Arthur Lazar.)

agents that would lead you to believe that if you had no formaldehyde say, for example, in your laboratory, that you would substitute for formaldehyde in example 1 an inorganic reducing agent and expect to obtain a diazo print with a background that did not discolor?

“A. No. Organic and inorganic compounds are two entirely different things, and it would not occur to me, if an organic reducing agent were so specified.

“Q. There is nothing common between the two, organic and inorganic reducing agents?

“A. No.

“Q. I now hand you defendant's Exhibit B, constituting the file wrapper of letters patent to H. D. Murray, No. 1,753,059, issued by the United States Patent Office on April 1, 1930, and refer you to page 5 of this file wrapper, and ask you to read to the Court Claim 1.

Mr. HOFFMAN: Your Honor, I object to that question, that is irrelevant and immaterial in this connection.

The COURT: Overruled; an exception.

“A. Claim 1 of this patent reads as follows:

“A process of developing diazo types which comprises treating the latter with a developing solution containing an inor- [223] ganic reducing agent.”

The COURT: What is the date of that?

Mr. WHITE: The date of the patent is April 1, 1930; it was issued or matured on an application

(Testimony of Arthur Lazar.)

which was filed in the United States on September 14, 1929, and in Great Britain July 14, 1928, and this was the patent, I believe, which resulted in the disclaimer by the plaintiff of claims 7 and 9 of the second patent.

Mr. HOFFMAN: You are not exactly sure about that, it is only a supposition on your part?

Mr. WHITE: I would also like you to refer to page 2 of the file wrapper and read the paragraph just before the last paragraph, commencing, "According to the present invention."

"A. 'According to the present invention, the aforesaid color deterioration is retarded or rendered practically negligible by treatment of the diazo type paper or the like with an inorganic reducing agent.'

"Q. I would like to have you refer again to Defendant's Exhibit B, and particularly to the Patent Office letter of March 5, 1930, and ask you whether or not any patents to Van der Grinten were cited by the Patent Office.

"A. Yes. There were two patents of Van der Grinten cited against this one, the first one was Australian patent 8112 of 1927, and the second one is the Swiss patent, 130,917 of March 16, 1929.

Mr. WHITE: The Patent Office, as appears by the record, itself, issued a patent over these cited references.

Now, I would like to offer in evidence at this time United States Letters Patent No. 1,803,906, issued on May 5, 1931, to Kalle & Company, of Germany,

(Testimony of Arthur Lazar.)

on an application filed by William Krieger and Rudolph Zahn. The patent on its face shows that the original application was filed in Germany on February 16, 1928, and I ask that it be marked Defendant's Exhibit next in order. [224]

(The patent was marked "Defendant's Exhibit E.")

"Q. Doctor Lazar, I now hand you this Exhibit E, being the patent which I have just offered in evidence, and ask you whether or not you have read that patent.

"A. Yes, I have.

"Q. Briefly, what does that patent refer to?

"A. It refers to a diazo type stabilized with a derivative of thiocarbonic acid to process the paper with.

"Q. You will note, Doctor, that this patent states at the top thereof 'Application filed in Germany February 16, 1928,' and have you compared that copy of the patent with the file wrapper of the German patent No. 526,370, Defendant's Exhibit A?

"A. Yes, I have.

Mr. HOFFMAN: Your Honor, I object to that. That patent was stricken out on a motion to strike. You recall we brought a motion to strike and that patent is No. 1,803,906, and there was a decision rendered by this Court under date of——

Mr. WHITE: If your Honor please, in connection with that motion to strike, that motion to strike was with respect to prior art patents. I am

(Testimony of Arthur Lazar.)

introducing this patent, and this testimony, to show the Court that the United States Patent was granted on an invention similar to the one which was filed in Germany, and which the Van der Grintens have opposed. I am only introducing that to show that they obtained the patent in the United States later. It was later filed in the United States and later issued, and we are showing that it was pending during the United States application of the Van der Grintens, and for no other purpose.

The COURT: Motion denied.

“Q. Are the two applications substantially identical?

“A. Yes.

“Q. Will you please state for the purpose of the record when [225] this application was filed and when it issued?

“A. The application was filed February 6, 1929.

“Q. And the patent issued when?

“A. It was issued May 5, 1931.

“Q. Doctor Lazar, will you please refer to the printed copy of the Murray patent which is attached to Exhibit B and state whether or not in the example given on page 2 of that patent the substance sodium thiosulfate is mentioned.

“A. Yes, it is.

“Q. And that is an inorganic reducing agent?

“A. Yes, it is.

“Q. Now, with reference to Claim 1 of the first patent in suit. No. 1,821,281, and with particular

(Testimony of Arthur Lazar.)

reference also to Exhibit C, the patent to Kogel, United States patent 1,444,469, will you please state whether or not, if citric acid were contained in the diazo layer of the Kogel disclosure and that was developed with sodium carbonate, whether or not sodium citrate would remain in the finished print.

“A. Yes, it would.

“Q. And sodium citrate is a reducing agent, is it not?

“A. Yes, it is.

“Q. You have previously testified, have you not Doctor, that in example 2 of the second patent in suit, 1,841,653, the patentee or the inventor disclose the use of sodium citrate in order to arrest the discoloration of the background of the finished print, have you not?

“A. Yes, I have.

“Q. With specific reference to claim 3 of the first patent in suit, 1,821,281, will you please tell the Court whether or not the defendant company is practicing the process as defined in that claim?

“A. No, the defendant does not practice that process. [226]

“Q. Is it your testimony that the defendant does not practice the process of that claim because neither the defendant's paper nor the defendant's developer contain a reducing aliphatic compound?

“A. Yes.

“Q. Now, with reference to claim 4 of this patent in suit, wherein the claim defines a reducing amino compound capable of arresting under normal conditions the discoloration of the components

(Testimony of Arthur Lazar.)

formed on the background of said print, is it your testimony that the defendant is not practicing that process?

“A. Yes, it is.

“Q. Why do you so testify in that regard?

“A. Because there is no reducing agent in defendant’s paper or developer.

“Q. And there is, specifically, no reducing amino compound?

“A. No there is not.

“Q. With reference to claim 7 of this first patent, 1,821,281, will you please read to the Court the first step of that claim?

“A. ‘The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light.’

“Q. In so far as you know Doctor, does the defendant practice the first step of that claim?

“A. No, it does not.

“Q. In other words, the defendant does not, in the first instance, manufacture a diazo compound?

“A. No, they do not.

“Q. And in the second instance they do not apply a diazo compound to a base?

“A. No.

“Q. With reference to claim 8 in the first patent, 1,821,281—

Mr. HOFFMAN: Just a moment. I object your Honor, because no [227] foundation has been laid by the witness showing that he knows anything about the defendant’s business.

(Testimony of Arthur Lazar.)

The COURT: Objection overruled; exception.

“Q. With reference to claim 8 of the first patent in suit 1,821,281, the first step of claim 7 is incorporated in that claim 8 by reference, is it not?

“A. Yes, it is.

“Q. And your testimony with respect to whether or not the defendant is practicing the first step of that claim 8 is the same, is it not, as you have stated with reference to claim 7?

“A. Yes, it is.

“Q. And similarly, with respect to claim 16 in suit, in patent 1,821,281, the first step of that claim is similar, is it not, to the first step of claim 7?

“A. Yes it says the same.

“Q. And you have previously testified that the defendant does not apply its diazo compound to a base?

“A. Yes, I have.

“Q. Now with reference to claim 25 of that same patent in suit, is the first step of that claim similar to the first step of claim 7?

“A. Yes, it is.

“Q. Is the defendant practicing the first step of claim 25?

“A. No.

“Q. Why?

“A. Because the defendants do not apply to a base a layer containing a diazo compound bleaching on exposure to light.

“Q. Will you please refer to claim 40 of this first

(Testimony of Arthur Lazar.)

patent, No. 1,821,281, and state to the Court what element of the product is defined in that claim.

“A. The claim covers as a new product a base having a sensitive layer thereon containing a diazo compound bleaching upon exposure [228] to light, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of the finished print.

“Q. How would you manufacture a product of that character?

“A. In order to manufacture such a product I would have to experiment with a great number of reducing agents, in order to find out which agent would do the particular job claimed in this claim.

“Q. In other words, if you obtain a product or a diazo print having a background which did not discolor under normal conditions by using a diazo layer and some certain reducing agent that you might have found, then you would have practiced or have manufactured a product of the character defined in that claim: Is that correct?

“A. That is correct.

“Q. The specification of this patent refers to what type of reducing agent, Doctor?

“A. To organic reducing agent.

“Q. The examples in the specification names what type of reducing agent?

“A. They also name organic reducing agents.

“Q. Are there inorganic reducing agents mentioned in this application or these specifications?

(Testimony of Arthur Lazar.)

“A. I have not found any.

“Q. Does the defendant company, in your opinion, manufacture a product of the character defined in claim 40?

“A. No, it does not.

“Q. Why?

“A. Because they do not apply any diazo compound on the paper, they do not manufacture any paper of that kind.

“Q. Assume that the defendant company did manufacture or sell diazo layers, does the defendant company include a reducing [229] agent in the paper or layer?

“A. No.

“Q. Is your answer no?

“A. No.

“Q. With reference to claim 41 of this patent, the diazo sensitive layer is incorporated in that claim by reference, is it not?

“A. Yes.

“Q. Does the defendant company manufacture a diazo sensitive layer including a reducing amino compound?

“A. No, they do not.

“Q. Referring you now to the second patent in suit, 1,841,653, I will ask you to refer to claim 1 and tell the Court whether or not the defendant company is practicing the process defined in that claim and, if not, why not?

“A. The defendant does not practice the process as defined in that claim because there is no re-

(Testimony of Arthur Lazar.)

ducing agent non-decomposable by alkali in their developer.

“Q. Is a sodium citrate a reducing agent non-decomposable by alkali?

“A. Yes, it is.

“Q. You have previously testified have you not, that the United States patent to Kogel, No. 1,444,469 if made with a layer containing citrate acid and developed with sodium carbonate, would contain sodium citrate in the finished print, did you not?

“A. Yes, I did.

“Q. I now hand you Defendant's Exhibit D, namely the German patent to Gronau No. 426,570, together with the translation thereof, and ask you whether or not the apparatus disclosed in the drawing of that patent is capable of practicing the process or performing the process of claim 1 of the second patent in suit?

“A. Yes, this apparatus is capable of performing this process. [230]

“Q. Will you please show that drawing of that patent to the Court and explain how that apparatus functions?

“A. This apparatus consists of a series of rollers; the lower roller is immersed in a bath which holds the developer liquid. By putting the belt in motion—beforehand I should say there is an endless belt fixed around these rollers in such a way that when the belt is immersed in the bath and is moved

(Testimony of Arthur Lazar.)

along the roller it will carry some of the liquid out of the bath along its way, and when the paper is inserted into the upper slot, as indicated by the arrow here, and the apparatus is turned clockwise, the paper will be applied with a breath-thin liquid of this developer which is on this guiding belt, and while the paper is continued through this center roller and out through this slot it will leave this apparatus practically dry, because the endless belt will squeeze the excess liquid out of the paper fiber. The paper is inserted at the place of the upper arrow 6 and makes its way out through at that place which is indicated by the arrow 7.

“Q. Is a thin film of the developing liquid applied to the sensitive layer with that apparatus?”

“A. Yes, it is.

“Q. Will you kindly look at the second page of the translation of that patent and read to the Court the statement just above the claims?”

“A. The last paragraph on page 2 before the claims is:

“Since the paper is developed by the above-described process in a very short time, the path which it covers in the apparatus can be shortened considerably, so that an appreciable saving on the guiding rollers is accomplished.”

“Q. Will you read the paragraph which precedes that?”

“A. The preceding paragraph, the last sentence, is “Due to the fact that the non-absorbent belt is

(Testimony of Arthur Lazar.)

only slightly moistened [231] with the developer liquid, the paper comes out of the apparatus almost dry, so that in the atmosphere it dries within a few minutes.

“Q. Would it make any difference whether the developer liquid contained one ingredient, two ingredients, or three ingredients?

“A. No, it would not make any difference as long as all of these ingredients are in the solution.

“Q. I would like to refer you again to Defendant’s Exhibit C, being the United States patent to Kogel, No. 1,444,469, and particularly to page 2, example 1, and ask you to state to the Court whether or not Kogel discloses a developer liquid containing an azodyestuff component, and an alkali liquid.

“A. Yes, there is disclosed in the example 1, “after the exposure under a positive the paper is put into an alkali solution of resorcinol which thus produces a positive violet photograph or picture.

“Q. So that if that developer liquid disclosed in the Kogel patent was used in the bath of the apparatus of Gronau, would the Gronau apparatus deposit a thin film of that developer upon the diazo type surface?

“A. Yes, it would.

“Q. Will you kindly refer to claim 3 of the second patent 1,841,653 and tell the Court what the difference between the elements of claim 3 and claim 1 are ?

“A. The difference between claim 3 and claim 1 is that in claim 1 is disclosed a reducing agent non-

(Testimony of Arthur Lazar.)

decomposable by alkali. In claim 3 a thin film containing an azodyestuff component in an amount not substantially in excess of that required to couple with the diazo compound.

“Q. What is the difference between claims 1 and 3 with specific reference to the developing liquid?

“A. The distinction between the developing liquids is that in [232] claim 1 the developing liquid consists of a reducing agent non-decomposable by alkali and in claim 3 the developing liquid consists of an alkaline liquid containing an azodyestuff component.

“Q. Claim 1 also includes in the developing liquid an alkaline substance and an azodyestuff component?

“A. Yes, it does.

“Q. In other words, there are three elements in the developing liquid of claim 1 while in claim 3 there are how many?

“A. In claim 3 there are only two.

“Q. In other words, the reducing agent non-decomposable by alkali is not contained in that claim?

“A. That is true.

“Q. Does the apparatus disclosed in the Gronau patent to which you have just referred place an amount of the developing liquid on a diazo layer not substantially in excess of that required to couple with the diazo compound?

(Testimony of Arthur Lazar.)

“A. Yes, the apparatus performs that function.

“Q. With reference to claim 4 of the second patent, 1,841,653, what is the composition of the developing liquid mentioned in that claim?

“A. In claim 4 the composition of the developing liquid is a non-volatile alkaline substance only.

“Q. Does the Kogel patent disclose a developing liquid comprising a non-volatile alkaline substance?

“A. Yes, it does.

“Q. Would the Gronau apparatus saturate throughout the entire area of an exposed surface of a diazo print a developing liquid containing a substance as disclosed in Kogel, namely, a non-volatile alkaline substance, by spreading that liquid on the surface of that diazo layer in the form of a uniformly thin film in only a sufficient quantity being substantially that [233] required to effect the development of the surface? In other words, would the Gronau process do that?

“A. Yes, I believe it would, because once the paper is saturated by being moved along the belt it is at the same time squeezed between the belt and the rollers, and in this way the excess liquid removed.

“Q. Will you refer to claim 6 of the second patent 1,841,653, claim 6 being in suit, and tell the court what the developing liquid consists of as defined in that claim?

“A. The developing liquid in this claim is described as a liquid containnig a non-volatile alkaline

(Testimony of Arthur Lazar.)

substance and a reducing agent non-decomposable by alkali.

“Q. How does the developing liquid of that claim differ from the developing liquid of claim 4 which you have just read?

“A. It differs from the developing liquid in claim 4 in that it contains besides a non-volatile alkali a reducing agent non-decomposable by alkali.

“Q. In other respects, then, the claims are identical, are they, claims 6 and 4?

“A. Identical with the exception of this addition.

“Q. How does claim 6 differ from claim 1?

“A. Claim 6 differs from claim 1 in as far as claim 1 specifies an alkaline liquid which at the same time contains an azodyestuff component and a reducing agent; in other words, claim 6 contains one less ingredient.

“Q. Do you find anything in claim 1 which refers to saturating throughout the entire area the exposed surface of the diazo layer as defined in claim 6?

“A. No, there is nothing mentioned.

“Q. In other words, that is another difference between claim 6 and claim 1?

“A. Yes. [234]

“Q. Will you kindly compare claims 8 and 6 in so far as the developing liquid defined in each of those claims is concerned?

“A. The developing liquid in claim 8 consists of a non-volatile alkaline substance, an azodyestuff

(Testimony of Arthur Lazar.)

component, and a reducing agent non-decomposable by alkali. Claim 6 contains only a non-volatile alkaline substance and a reducing agent.

“Q. Not the azodyestuff component?”

“A. Not the azodyestuff component.

“Q. With reference to claim 11, specifically the first part thereof, will you please state the difference between that claim and claim 8?”

“A. Claim 11 reads as follows:

“The process for developing direct positive diazo prints containing a diazo compound of the type which can not be used together with azo-dyestuff components in the light sensitive layer which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and a azo-dyestuff component by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.”

“Q. In your opinion, Doctor, will the Gronau apparatus function to practice that process, assuming that the developing liquid in the bath of the Gronau apparatus consists of a non-volatile alkaline substance and an azodyestuff component?”

“A. Yes, I think it would.

“Q. You have previously testified that the Kogel patent, United States patent 1,444,469, discloses a

(Testimony of Arthur Lazar.)

developer containing a non-volatile alkaline substance and an azodyestuff component?

“A. Yes, I did. [235]

“Q. Now, will you kindly refer to claim 13 of the second patent in suit, 1,841,653, and particularly with reference to the sixth line of this claim, commencing with the words ‘by momentarily wetting,’ etc., and state to the Court whether or not the Gronau apparatus will perform the function of that claim.

“A. Yes, I think the apparatus would perform that function.

“Q. Will you please compare claim 15 of the second patent in suit, 1,841,653, with claim 13, and point out the difference to the Court between those two claims?

“A. In claim 13 the claim calls for “saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance by momentarily wetting the exposed surface with an excess of said liquid and removing the excess immediately thereafter,” etc. Claim 15 calls for “saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and a reducing agent non-decomposable by alkali by momentarily wetting the exposed surface with an excess of said developing liquid and removing the excess immediately thereafter,” etc.

(Testimony of Arthur Lazar.)

“Q. In other words, the only difference between those two claims is the presence of the reducing agent non-decomposable by alkali, is that right?

“A. Yes.

“Q. Now, referring to claim 16 of this second patent in suit, 1,841,653, will you please state the difference between the subject-matter of that claim and the subject-matter of claim 15, in other words compare the two claims?

“A. Claim 16 shows the difference in the composition of the developer by making it of azodye-stuff component along with a non-volatile alkaline substance, whereas the preceding claim mentions the alkaline substance and a reducing agent [236] non-decomposable by alkali.

“Q. In claim 18 in suit of this second patent, No. 1,841,653, what is the difference between that claim and claim 16?

“A. Claim 18 includes in its developing liquid all three substances, the non-volatile alkaline substance, the azodyestuff component, and the reducing agent non-decomposable by alkali.

“Q. Will the apparatus which is shown in the Gronau patent to which you have repeatedly referred perform the process defined in claims 15, 16, and 18, in your opinion?

“A. Yes, I think it would.

Cross Examination

“Q. Now Doctor, I hand you a copy of Defendant's Exhibit C, that is the Kogel patent, No.

(Testimony of Arthur Lazar.)

1,444,469. Does the term “reducing agent” appear at any place throughout this Kogel patent?

“A. In order to be quite sure about it I would have to read it again.

“Q. Suppose you do so.

The COURT: How long will it take to read it?

“A. About ten minutes.

“Q. Doctor, have you completed the reading of the patent?

“A. Yes, I have.

“Q. What is your answer?

“A. My answer is, there is no word mentioned about reducing agent, nevertheless reducing agents are applied.

The COURT: “Q. Reducing agent is mentioned, did you say?

“A. No, the word reducing agent is not mentioned, your Honor, in the patent.

“Q. Doctor, will you please examine the Kogel patent and tell us wherein it states anything concerning discoloration of the background of the finished diazo print after storage of such finished print? [237]

“A. It does not mention this particular function of the reducing agent.

“Q. Then there is not a word in there about that?

“A. There is no word about the discoloration of the background.

“Q. With further reference to the Kogel patent, I call your attention to example 3 in that patent; in

(Testimony of Arthur Lazar.)

that example, line 129 on page 2, it mentions tartaric acid, does it not?

“A. Yes, it does.

“Q. Is it not a fact that the tartaric acid in this example 3 of this Kogel patent is added to the sensitive layer containing both a diazo compound and the azo coupling component?

“A. Yes, it is.

“Q. With further reference to this Kogel patent Doctor, I refer you to the sentence beginning in line 78 on page 1 and ending at line 80 of the same page, and will ask you to please read the sentence.

“A. ‘To obtain still greater stability of the light-sensitive layer small additions of acid, such as tartaric or citric acid are made.’

“Q. Is it not a fact that the substance which is added to the sensitive layer, according to this sentence, is added on account of its acid properties?

“A. It does not express that; it just states that acids, such as tartaric or citric, are added. It does not say that it is added on account of its acid properties.

“Q. If it is an acid it must have acidic properties: Is that not correct?

“A. Yes, that is correct.

“Q. Is it a fact that this substance, tartaric acid, is then added to the layer, and does that not mean that this substance is added to the layer for the express purpose of its acidic property? [238]

“A. No, I cannot see that from the sentence. It states “To obtain still greater stability of the light-sensitive layer.”

(Testimony of Arthur Lazar.)

“Q. The sentence states that acids are added to the sensitive layer, does it not?

“A. Yes, it does.

“Q. If acids are added to the sensitive layer it is because of the acidic property that they have, is it not?

“A. That is not obvious from this sentence, that the addition takes place on account of the acidic properties.

“Q. Does an acid have an acidic property, or does it not?

“A. Yes, it does.

“Q. If an acid has an acidic property it exerts that acidic property when it is added to the layer: Is not that correct?

“A. Yes, it does.

“Q. Now Doctor, it is not a fact that an acid counteracts the formation of an azodyestuff from a diazo compound and an azodyestuff coupling component?

“A. Yes, it does.

“Q. With still further reference to the sentence which you have just read, is it not a fact that according to this sentence the acid is added to the sensitive layer for the purpose of counteracting the formation of an azodyestuff?

“A. The sentence does not state that. The sentence states ‘To obtain still greater stability of the light-sensitive layer.’ It does not specify in which respect the stabilization takes place.

“Q. If you have a sensitive layer that has a diazo compound in it and also a azodyestuff component in

(Testimony of Arthur Lazar.)

it, and since both the diazo compound and the azodyestuff component couple together and form a dyestuff, in the presence of or under alkaline conditions, is it not true that if you add an acid to that layer—and I am now talking about the layer that has the diazo com- [239] pound in it, and an azo coupling component, is it not a fact Doctor, that that acid prevents the coupling of these two compounds together to form an azodyestuff?

“A. Yes; I stated that before.

“Q. Could the acid have any other function in the layer than preventing the premature coupling of the azo coupling component and the diazo compound?

“A. Yes, I think it could, since tartaric acid is a reducing agent, and since——

“Q. Now wait a minute Doctor. Please answer the question. This question is confined to the statement you have read out of that patent. I am referring to the statement that you just read from lines 78 to 80 on page 1 of that patent.

Mr. WHITE: May I have the question read, your Honor?

The COURT: Yes.

Mr. WHITE: The witness has answered yes, and I think he is entitled to explain his answer.

The COURT: He may explain it.

“A. My answer is that the addition of tartaric acid to the layer could have another function besides that of preventing coupling, because after the de-

(Testimony of Arthur Lazar.)

veloping of the print the tartaric acid still will be left in that layer and will be able to stabilize the discoloration of the background by a reducing agent.

“Q. Doctor, that is your opinion, is it not?

“A. It is not only my opinion, but it also has been expressed during this trial so many times that the reducing agents are capable of arresting the discoloration of the background.

“Q. You just stated previously that there is no statement in the entire Kogel patent which even mentions a word about the preventing of the discoloration of the background of the finished print.

[240]

“A. That is true.

“Q. Then how can you say that that sentence contained in lines 78 to 80 of page 1 of the patent means that when you add the acid to the sensitive layer that you prevent discoloration of the background in the finished print?

“A. I was asked what other effect could it have, and I was stating that effect.

“Q. But that effect Doctor, is not even disclosed in that patent, is it?

“A. No, it is not.

“Q. No statement about that in the patent, at all?

“A. No. I stated that before.

“Q. Now Doctor, what is the function of this tartaric acid when it is in the sensitive layer, that is,

(Testimony of Arthur Lazar.)

in the sensitive layer which contains the diazo compound and the azo-coupling component?

“A. According to the words of the patent it is added to obtain still greater stability of the light-sensitive layer.

“Q. In your opinion, what does that mean?

“A. It means, if I read the whole passage, that it is added to prevent the coupling of the azo component and the diazo compound.

“Q. Then Doctor, as I understand your testimony, it is that the acid in the layer prevents the premature coupling of the diazo compound and the azodyestuff component?

“A. Yes, it does. I have stated that before, too.

“Q. Is or is not this purpose of preventing premature coupling of the sensitive layer entirely different from the purpose of arresting discoloration of the background of the diazo type print?

“A. Yes, it is.

“Q. Now Doctor, I again refer you to Example 3 of the Kogel [241] patent, and ask you to state whether you have made positive diazo type prints according to this example in which one-half of one per cent. of tartaric acid was used in the sensitive layer and whether the print thus obtained did or did not show discoloration of the background of the said print after an extended period of storage say for instance, six months.

“A. No, I have not made any experiments with this composition.

(Testimony of Arthur Lazar.)

“Q. Then Doctor, as a matter of fact, you do not know whether a print made according to example 3 will or will not discolor after extended periods of storage?

“A. I do not know.

“Q. Doctor, as I understand your testimony with respect to this example 3 of the Kogel patent, and also the statements contained in lines 78 to 80 of page 1, the tartaric acid is used in the sensitive layer on account of its acid properties for stabilizing the light-sensitive layer, and that the amount of tartrate which is formed from the tartaric acid, and which is present in the finished diazo type print after development, is not sufficient to arrest the discoloration of the background of the diazo type print?

Mr. WHITE: I object to that question on the ground that the witness has already said he has not experimented with this example, nor has he made any prints, nor does he know whether it is discolored.

The COURT: Overruled; an exception.

“A. May I have the question read?

The COURT: Read the question.

“A. I could not say whether the amount is sufficient or not to arrest the discoloration of the finished print. I can only say that there is sodium tartrate left in the finished print.

“Q. But you have testified that sodium tartrate, or sodium citrate, depending upon which acid you

(Testimony of Arthur Lazar.)

added in your sensitive [242] layer acted as a reducing agent, and was present in the finished print and prevented the discoloration of the background. Did you not so testify?

“A. I said it could prevent it, due to the fact that it is a reducing agent.

“Q. But Doctor, you are stating that as your opinion, not based on any experiments, or anything?

“A. I am stating that as my opinion, because it has come up in this trial so many times that the reducing agents are capable of arresting the discoloration of the background.

“Q. But as a matter of fact, since you have not practiced the process you do not know whether it does or does not?

“A. No I do not, and I do not know that in regard to many reducing agents, of which there are millions known.

“Q. Doctor, I call your attention to Plaintiffs' Exhibit No. 2, that is the second Van der Grinten patent in suit, No. 1,841,653, and ask you to refer to example 2 of this patent. Doctor, you have testified that in example 2 of this patent 10 per cent. of sodium citrate is used in the developer.

“A. Yes, I have.

“Q. Is it not a fact that the quantity of sodium citrate in the finished print made according to this example 2 is twenty times as great as the quantity

(Testimony of Arthur Lazar.)

of citrate present in the finished print made according to example 3 of the Kogel patent?

“A. Yes, it is ten times more concentrated.

“Q. Twenty times?

“A. Twenty times more concentrated.

“Q. Now Doctor, you have testified about the possibility of impressing a thin film containing an alkali, an azodyestuff component, and a reducing agent—non-decomposable by alkali, such as citric acid, on a diazo layer with the Gronau apparatus.

“A. I do not remember that testimony, because citric acid could [243] not exist in the presence of alkali.

“Q. Now to refresh your memory, I will read from the transcript of the record of yesterday afternoon on page 185. The question was:

“Q. Now, Doctor, having in mind the fact that the diazo type is made in accordance with the Kogel disclosure and used citric acid in the developer as well as azodyestuff component and also having in mind the disclosure of the Gronau patent, do you feel that it would be possible to impress a thin film containing an alkali, an azodyestuff component and a reducing agent non-decomposable by alkali, such as citric acid, on a diazo layer with the Gronau apparatus?” And your answer to that question was “Yes.”

“A. Yes.

“Q. Now Doctor, would you state whether it is or it is not a fact that citric acid could not be con-

(Testimony of Arthur Lazar.)

sidered as a reducing agent non-decomposable by alkali?

“A. Citric acid, as such, is not able to exist in the presence of alkali, because it will form immediately a citrate. The alkali dissolves the citric acid, but does not decompose in any sense of the word.

“Q. What do you mean, that it is not decomposed when the citric acid is brought together with alkali?

“A. I just mean that the sodium salt of citric acid is left; I would not consider it a decomposition when a salt forms.

“Q. Is it not true that citric acid is an acid?

“A. Yes, it is.

“Q. And sodium citrate is a salt?

“A. Yes, it is.

“Q. Is it also not true that citric acid has acid properties and acts as an acid whereas sodium citrate is a salt and is neutral?

“A. Yes, that is true, but the sodium citrate retains all of [244] the properties, including the reducing properties, of citric acid.

“Q. In other words Doctor, citric acid does not exist as such in the presence of alkali: Is that correct?

“A. That is correct.

“Q. Doctor I hand you Defendant's Exhibit C, the Kogel patent 1,444,469, and ask you to refer to

(Testimony of Arthur Lazar.)

example 9 in this patent. Is it stated in that example that the developing liquid described therein is impressed upon the surface to be developed in the form of a uniformly thin film?

“A. No, it is not.

“Q. Where in that example 9 is it stated that the exposed surface of the print is saturated throughout its entire area with the developing liquid described in such example in the form of a uniformly thin film?

“A. It states that the development is effected by dipping the paper in a bath; this means, of course, complete saturation. If the paper is pulled out of the bath and the solution allowed to drain off, the film will be uniform.

“Q. Where in that example does it say that the exposed surface is only saturated throughout its entire area?

“A. It does not say that in so many words, it just says it is immersed in a bath.

“Q. If it is immersed in a bath how can only the exposed surface of the print be saturated with the liquid?

“A. Not only the exposed surface is saturated but besides that the remainder of the paper is saturated.

“Q. In other words, you would saturate not only the exposed surface but the back of the paper, the complete paper?

“A. Yes, the whole paper, is saturated.

(Testimony of Arthur Lazar.)

“Q. Then as a matter of fact that example does not describe or teach that this developing liquid is applied to only the exposed [245] surface of the print?

“A. No, it does not say that.

“Q. With reference to example 9 of the Kogel patent, where is it stated therein that the exposed surface of the print is saturated with the developing liquid described in such example by momentarily wetting the exposed surface with an excess of said liquid and removing the excess immediately thereafter so as to dispose a uniformly thin film of said liquid to said surface?

“A. It does not state it in that manner but, as I stated before, if a paper is immersed in a bath the saturation is uniform, and whether it is momentarily wetted or for any length of time that is up to the man that processes the development. He can dip it in for a second and pull it out immediately and that would effect the same result, that would mean momentarily wetting.

“Q. As a matter of fact Doctor, when you dip the print in the bath you are not only saturating the exposed surface, but also the back side of the paper, are you not?

“A. Yes, that is true.

“Q. The question asked was where in that patent is it stated that this developing liquid is applied to only the exposed surface?

“A. It does not state it any where in this patent, but this patent is not an-apparatus patent, it is a

(Testimony of Arthur Lazar.)

process patent; how the process is carried out is a different matter—I mean with what equipment the process is carried out.

“Q. As a matter of fact, that example says nothing in there about only applying the developing liquid to only the exposed surface, does it?

“A. No, it does not.

“Q. And also Doctor, where in that example is it stated that [246] the excess is immediately removed thereafter, after you first saturate the exposed surface and then immediately remove it?

“A. It states here that the material is then washed and that is the equivalent to removing the excess.

“Q. I asked you whether the excess was not immediately removed.

“A. That depends on the speed of the operator. He can do it immediately after the immersing.

“Q. Doctor, if you take a print and you have a bath and you immerse the print in there, no matter how quickly you do it, and then pull it out, by that immersion you certainly will saturate the both sides of the paper, not only the exposed surface, but also the back of the print, will you not?

“A. Yes, that is true.

“Q. If that is true, then, the patent says nothing at all about saturating only the exposed surface of the print and momentarily removing the excess from that exposed print, does it?

“A. It does not.

(Testimony of Arthur Lazar.)

“Q. Now Doctor, with respect to this example 2 of the Kogel patent, will you please state whether according to that you get a positive or negative diazo type print?

“A. After developing, you mean?

“Q. After the complete process as you described it in that example do you get a negative or positive print?

“A. A positive print.

“Q. Now Doctor, with reference to this example 2 of this Kogel patent, lines 119 to 126, page 2 of the patent, the light sensitive layer on the face of the film contains a diazo compound and an alkali like sodium hydrate, is that correct?

“A. Yes.

“Q. Now, the light-sensitive diazo compound when exposed to light by decomposition is changed into a phenol and phenol [247] is an azodyestuff component, is that correct?

“A. Yes.

“Q. If the sensitized paper of this example is exposed to light under a transparent tracing of which a print is desired, the light attacks the parts not protected by the dark lines of the image and thus decomposes the diazo compound into a phenol which is an azo coupling component. Because of the presence of the alkali, sodium hydrate, in the sensitized paper, the azo coupling compound, phenol, as soon as it is formed, immediately combines with other diazo compounds which the light has not

(Testimony of Arthur Lazar.)

yet attacked, so that after exposure you have a dark color in the parts of the print which were not protected by the black lines of the image, and this black part of the print forms the background of the finished print. Then when you wash the print, after exposure, with a diluted sodium hydrate solution, as stated in the example, this washing removes the light-sensitive diazo compound from the unexposed parts of the print, and so you have a white image on a dark background: Is that correct?

“A. Yes, that is correct.

Mr. WHITE: I object to the question and move to strike the answer on the ground the Doctor has not qualified as having practiced the process of the Kogel patent in the first instance, and, in the second instance, the question as put by counsel specifies that the Kogel process does certain things. The Doctor has not practiced the Kogel patent.

The COURT: Overruled; exception.

“Q. Then this example 2 of the Kogel patent produces a negative diazo type print and not a positive type print, is that correct?

“A. Yes, that is correct, I was wrong in my first answer.

“Q. Are positive and negative type prints the same or are they [248] different?

“A. They are different, of course.

“Q. Will you please read the title of the second patent in suit and state whether this patent is directed to a negative or to a positive diazo type process?

(Testimony of Arthur Lazar.)

“A. A process for developing positive diazo type prints.

“Q. So, if I understand you correctly, then example 2 of the Kogel patent produces a print which is a negative one, while the second patent in suit produces a positive diazo type print: Is that correct?

“A. That is correct.

“Q. So that if I understand you correctly the process according to example 2 of the Kogel patent gives the opposite result to that obtained by the process of the second patent in suit, is that correct?

“A. That is correct, and I referred to it by error.

“Q. Now, with reference to one of your answers on page 202 of the transcript, I ask you to state whether it is correct to say that the paper in the Gronau device is squeezed between the belt and the roller, or whether it is correct to say that it is squeezed between the belt and the roller 2 in this diagram.

“A. It is only squeezed between the belt and the roller No. 2.

“Q. Will you please indicate that there?

“A. The paper is squeezed here and comes around this way and comes out.

“Q. Is it squeezed between the belt and the rollers?

“A. Between the belt and this big roller.

“Q. That is the roller number 2?

“A. Yes.

(Testimony of Arthur Lazar.)

“Q. Did you state that in the Gronau process one could apply to the paper an excess developer liquid which is squeezed off between the belt and roller 2: Is that correct? [249]

“A. Yes.

“Q. Will you please inspect the Gronau patent and state where this patent describes the application of an excess liquid to the paper—please refer to the translation.

“A. On top of page 2 it says that the paper to be developed is introduced through the slot, Fig. 6; it arrives between the moistened part of the endless belt and as it is clearly indicated the paper is saturated, the surface is saturated by the moisture on the belt, and it is uniformly saturated.

“Q. Will you state where that patent describes the squeezing off of this excess.

“A. That is the nature of this apparatus, that there is a certain pressure exercised on the material that goes between the belt and the roller, through the apparatus, and naturally this pressure will squeeze out any excess liquid.

“Q. Will you please state where the patent describes an excess application of liquid to the belt?

“A. It does not describe an excess application to the belt, the belt can only carry as much as the surface allows, but there can be more than sufficient to saturate the paper to excess.

“Q. Then, if I understand you correctly, the Gronau patent does not teach the application of an

(Testimony of Arthur Lazar.)

excess and the removing thereof with regard to the belt?

“A. I did not say that. The belt could not carry an excess, because all excess liquid will run off the belt, but the belt carries enough liquid to saturate the paper with an excess, or the surface of the paper with an excess.

“Q. The belt is described as being non-absorbent.

“A. It is not deliberately made sponge-like to absorb liquid, but any surface will absorb liquid when it is pulled through liquid, that is a well known fact.

“Q. If you have a non-absorbent belt how are you going to get [250] an excess of liquid on it, that will be retained on it? You have surface tension, do you not?

“A. Yes, surely there is surface tension.

“Q. That will tend to push it off?

“A. Not always, it depends on the liquid and the material of the belt.

“Q. But on a non-absorbent surface that would be true, would it not?

“A. Well, I would have to see whether it uses the expression ‘non-absorbent.’ It says non-absorbent and not non-adsorbent.

“Q. You are not going to attempt to draw a distinction between non-absorbent and non-adsorbent are you, Doctor?

“A. Yes, there is a great difference.

“Q. What is the difference between non-absorbent and non-adsorbent?

(Testimony of Arthur Lazar.)

“A. If a surface absorbs a liquid that means that a large amount could be taken in either to the surface or to the material as such. Adsorbent refers only to the surface. Much smaller quantities are involved then.

“Q. As I understand it Doctor, absorbent means the taking up of liquid in the entire body of that material that is absorbed, is that correct?

“A. Yes.

“Q. The term in that description or in the translation of this patent states that the endless belt is non-absorbent, that it is a non-absorbent belt. I call your attention to lines 4 and 5 of the first paragraph of the translation on page 2.

“A. Yes.

“Q. That being the case then, as I understand you, a non-absorbent belt would be one that would not take up any liquid?

“A. The way that I understand that is that the belt has not a sponge-like surface. The German text uses a word ‘saugen,’ [251] which means to suck. That could only refer to a sponge-like surface.

“Q. You just testified that an absorbent material is one that takes up the moisture, takes a whole lot of it up.

“A. An absorbent?

“Q. Yes, I am talking of absorbent, a-b-s-o-r-b-e-n-t.

“A. Yes.

(Testimony of Arthur Lazar.)

“Q. The term in that translation says non-absorbent. Therefore, that has a negative limitation to it. As I understand it, that term would mean that it cannot take up any liquid whatsoever, or to a very negligible extent.

“A. It does not say that. It says that it is to be understood that this belt has not a sponge-like surface.

“Q. Will you please read the Gronau patent, the third paragraph on page 1 of the translation?

“Q. ‘It is already known to conduct a roller equipped with a sponge-like surface saturated with the developer liquid over the layer to be developed. In this process the sensitive layer, during the developing by liquids liberating alkaline gases would be moistened with liquid to such an extent that the drawing would come out blurred. In order to prevent this, according to the invention, the layer to be developed is moved about in contact with the developer liquid on a common carrier covered with a layer of the developer liquid as thin as though it were applied by breathing thereon.’”

“Q. Is it not a fact that the paragraph you have just read teaches that the developing liquid is applied to the belt in a layer as thin as if it were breathed thereon?

“A. Yes, it does.

“Q. Is it not a fact that this same paragraph teaches that the application of an excess of develop-

(Testimony of Arthur Lazar.)

ing liquid to the layer to be developed causes blurring of the drawing or print? [252]

“A. Yes, it does.

“Q. So, as I understand you, the Gronau patent not only does not teach at all the application of an excess and the entire removal thereof by squeezing, but teaches the opposite procedure: Is that correct?

“A. I would not say it teaches the opposite procedure; it teaches only the application of a thin film, it specifies the thinness of the film by saying ‘breath-like.’

“Q. You just previously testified that this paragraph does not teach the application of an excess of developing liquid to the layer to be developed because it causes blurring of the layer; didn’t you say that that is what it said?

“A. Yes, this paragraph mentions that, that an excess is not desired.

“Q. If the paragraph says that, then how can you say that it does not teach at all an application of an excess of liquid to the belt?

“A. This paragraph teaches that an excess on the paper is undesirable.

“Q. Is it not a fact that the person who would use the Gronau device for applying an excess and removing it would use this device in a way which is essentially different from the way that the Gronau patent teaches to use a device?

“A. No, I cannot agree with that. The Gronau device teaches to apply a breath-thin film of developer on a paper.

(Testimony of Arthur Lazar.)

“Q. You have just stated Doctor, that an excess of developing liquid could be squeezed off by the Gronau device between the belt and the big roller 2 on the diagram. I am now referring to the diagram. Is that right?

“A. Yes, it could be.

“Q. If an excess were thus squeezed off, then would not this take place at the point where the belt first touches the roller [253] 2, namely, referring to the diagram, at the spot toward which the arrow No. 6 points? I mean this point, right here.

“A. Yes, the squeezing process would begin right there.

“Q. That being the case Doctor, is it not a fact that the squeezing of the excess of the developing liquid would drain down along the face of the roller 2 in a direction opposite to the direction of rotation of the roller 2?

“A. Yes, it would.

“Q. That being the case Doctor, is it not a fact that after the apparatus has been functioning continuously for some time the squeezed-out excess of the developing solution would collect at the point where the belt leaves the roller 2 and therefore would wet the print again with an excess which is not removed, as the print immediately thereafter leaves the machine in the direction indicated by the arrow 7?

(Testimony of Arthur Lazar.)

“A. In no place in this patent is it said that the paper being ejected in the direction of arrow 7 comes in contact with the roller No. 3.

“Q. Just a moment Doctor: This is what the question asked, whether this developing liquid which falls down here on this roller 2 and rides around here, and here is the print coming out here and it is ejected here at 3, if this excess falls off here it will run down on this roller and will be picked up as this print comes back here and will fall on the back of the print, and the print is then ejected at that point and the excess is not removed from that print: Is that correct?

“A. The liquid is carried around this roller and back into the bath and the paper is ejected here and does not touch this roller.

“Q. Let me ask you another question Doctor: Is it not a fact that as you put the print in at 6 it passes around in between this belt and the periphery of roller 2 and passes completely [254] through this contact until it gets down to this point, close to the point of roller 3?

“A. Yes.

“Q. And as the print comes out here this print obstructs the belt; in other words, the point is between this belt here, the surface of this belt, and you have testified the excess fell off here and went along here; naturally, as this print came out here it would fall on the back of the print; this excess certainly could not get to the belt: Is that correct?

“A. Yes, that is correct.

(Testimony of Arthur Lazar.)

“Q. Then is it not a fact that when the Gronau device is operated in this manner it does not in the ultimate analysis produce a print from which the excess of developing liquid has been removed.

“A. I think that could happen, that some liquid could stay on the paper.

“Q. Now Doctor, I hand you Plaintiffs' Exhibit No. 11, which consists of the title page and pages 10 and 11 of Couch's dictionary of chemical terms, and the title page and page 92 of the Funk & Wagnalls dictionary. Is it not a fact that according to the definitions in Couch and in Funk & Wagnalls a substance containing the Group NH_2 , as shown on the chart Plaintiff's Exhibit 12, is an amino compound?

“A. Yes, it is.

“Q. You testified that the formula shown on Plaintiffs' Exhibit No. 12 is that of thiourea.

“A. Yes.

“Q. Does thiourea, according to this formula, contain NH_2 group?

“A. It contains two NH_2 groups.

“Q. So, as I understand it, thiourea contains an NH_2 group and is, according to the definition of Couch and of Funk & Wagnalls, [255] an amino compound.

“A. Yes, it is.

“Q. Now Doctor, can a chemist be supposed to know what is meant by chemical terms when a clear definition of such terms has been obtained in

(Testimony of Arthur Lazar.)

a dictionary which is generally accepted in universities in this country?

“A. Yes.

“Q. Have you ever in your practice treated nitric acid with urea?

“A. No, I have not myself.

“Q. In order to refresh your memory I refer you to a method known to practically any chemist, of eliminating a surplus of nitric acid out of certain reacting mixtures by means of urea. Does this not bring to your mind the action of urea upon nitric acid?

“A. I am familiar with that reaction.

“Q. Is it not known to you that during the war, urea was used in gas masks to eliminate nitric acid vapors from the air?

“A. Yes, and so was active charcoal.

“Q. So that I understand that you recognize it as a fact that the urea acts upon nitric acid in such a way that the nitric acid disappears and that nitrogen is formed?

“A. Yes, and I know that any amino compound acts in the same or similar manner with nitric acid.

“Q. Is it not a fact that urea, in acting upon nitric acid, removes all, or at least part of the oxygen out of the nitric acid?

“A. Yes, that is true.

(Testimony of Arthur Lazar.)

“Q. So, if I understand you corectly, the urea removes the oxygen from the nitric acid: Is that correct?

“A. Yes, it reacts with nitric acid and something must happen to the oxygen. [256]

“Q. Is it not a fact that a substance which removes oxygen from another substance is a reducing agent, and in this connection I call your attention to Plaintiffs' Exhibit No. 9, page 506, line 10 from the bottom of such page, and ask you to read what that line says following the “1”.

“A. ‘A reducing agent is a substance which can remove oxygen from other substances.’

“Q. It is true is it not that urea must be considered a reducing agent?

“A. No, by no means, because any substance would be a reducing agent, because there are reactions known where even an oxidation agent can become a reducing agent, depending on what it reacts.

“Q. I must assume that you do not agree with the definition of reducing agent given on page 506, lines 10 and 11 from the bottom of this page, in Mellor's Modern Inorganic Chemistry, Plaintiffs' Exhibit No. 9.

“A. I agree with the statement in its general sense, but that does not make it a reducing agent because, as I explained the other day, if it was a reducing agent diabetic urine could not be tested for glucose, which is a reducing agent.

(Testimony of Arthur Lazar.)

“Q. Doctor, you stated that urea removes oxygen from nitric acid, did you not?

“A. Yes, I did.

“Q. Then we have urea on the one side and nitric acid alongside of it; the analogy is that urea goes over into the nitric acid and removes the oxygen out of it; a substance which in this analogy would be urea, which takes oxygen out of the substance nitric acid, that would be a reducing agent, according to Mellor, would it not?

“A. It is not a reducing agent on that ground.

“Q. Will you please refer to page 506, the tenth line from the [257] bottom.

“A. You mean the one I read before?

“Q. Yes, you have read it.

“A. ‘A reducing agent is a substance which can remove oxygen from other substances.’

“Q. In the analogy I gave you we have urea and we have nitric acid. Mellor says that a substance which can remove oxygen from other substances is a reducing agent.

“A. Yes, but I notice that this hand-book of Mellor is on modern inorganic chemistry, and we are dealing with organic substances here.

“Q. That is an authoritative work, is it not?

“A. Yes.

“Q. That statement is not limited to inorganic compounds, is it?

“A. That statement is limited to inorganic compounds, because it is contained in a hand-book on Modern Inorganic Chemistry.

(Testimony of Arthur Lazar.)

“Q. Will you please state where the limitation in there is?

“A. Right in the title of the book, Modern Inorganic Chemistry.

“Q. Does it state on those pages where it gives the definition that that is limited to inorganic compounds?

“A. If the whole book deals with inorganic compounds I expect to read nothing else from it.

“Q. As a matter of fact, you have this situation, have you not, you would have inorganic reducing agents and these inorganic reducing agents are oftentimes used with organic substances to reduce those and, therefore, if you wanted to find out whether a specific inorganic reducing agent—and of course I mean the properties that it would have on certain inorganic compounds and organic compounds, that would naturally be listed in a textbook of that character, would it not?

“A. No, inorganic chemistry deals only with ionic reactions. [258]

“Q. What would be the definition of an organic reducing agent?

“A. The definition could be made in many different ways. I could say that an organic reducing agent is such a substance which reduces cupric salt to cuprous oxide, or a reagent which converts ammoniacal silver solution into metallic silver.

“Q. In your illustration there Doctor, you are giving truly inorganic compounds, are you not?

(Testimony of Arthur Lazar.)

“A. No only as reagents, but not as reducing agents.

“Q. I wish you would give me a general definition without reference to any specific compounds or any specific reactions, I wish you would give me a general definition of what you mean by an organic reducing agent. By that general question I mean the property it must have before you would consider it an organic reducing agent.

“A. General definitions are very often misleading, like this one, here, where it says a reducing agent must remove oxygen from another substance. If that were generally true then any substance could be a reducing agent. I refer, for instance, to hydrocarbons, i. e. naphthaline. Would anybody call naphthaline a reducing agent because it is oxidized to phthalic acid by sulfuric acid in the presence of a catalyst?

“Q. Doctor, it is not a fact that there is really no difference between an organic and an inorganic reducing agent?

“A. Yes there is a difference, that one is an organic compound and the other one is inorganic.

“Q. I mean as regards the reducing property of the compound. I mean if you have an organic compound and you have an inorganic compound on the other hand, and you want to know whether they have reducing properties, and you find that they have, as a matter of fact do not they act in the same manner if they are reducing agents? [259]

“A. Yes, they do.

(Testimony of Arthur Lazar.)

“Q. If they act the same they then must have the same definition: Is that correct?

“A. Yes, but that does not say that this definition is generally acceptable.

“Q. As I remember it Doctor, I think you stated before that this definition by Mellor was acceptable: Is that correct?

“A. No, I did not state that.

“Q. According to this definition it is a reducing agent, is it not—urea?

“A. According to this definition it would be, but I do not agree with it.

“Q. When Doctor Van der Grinten stated that urea was a reducing agent his statement was in accordance with this definition of Mellor's, was it not?

“A. Yes, I believe that Doctor Van der Grinten made the statement in good faith.

“Q. I hand you Doctor, a copy of British patent No. 210,862, Plaintiffs' Exhibit No. 20. I wish you would examine this British patent No. 210,862 and the Kogel patent No. 1,444,469, and state if both of these patents are not Kalle & Company patents.

“Mr. WHITE: I will stipulate to that, your Honor, that they are substantially the same. Is that your question?

Mr. HOFFMAN: Yes, that is my question.

Mr. WHITE: All right, I will stipulate to that.

“Q. I refer you to the Gronau patent, Defendants' Exhibit D; in this Gronau device the liquid is

(Testimony of Arthur Lazar.)

not directly applied to the surface, but by the intermediacy of a belt, is that correct?

“A. Yes.

“Q. I now ask you Doctor, to state whether the device of the second patent in suit and the Gronau device are the same in [260] structure and operation.

“A. They are not the same in structure and operation, but they are the same in effect.

“Q. Doctor, in the Gronau device the liquid is applied first to the belt, and then to the print, and in the device of the second patent in suit the developing liquid is applied directly to the print, isn't that correct?

“A. Yes, it is.

“Q. So, as I understand, Doctor, the two devices, that is the device of the Gronau device and the device shown in the second patent in suit are different in structure and operation?

“A. Yes, they are.

“Q. Have you ever personally made any experiments as to a practical comparison between the Gronau device and the device shown in the second patent?

“A. No, I have not.

“Q. I refer by that comparison to whether you have made a comparison between the two as regards the mode of development in the process, as regards the mode of developing the exposed print in accordance with the process of the second patent in

(Testimony of Arthur Lazar.)

suit—that is what the question is intended to ask you, whether you have made a comparison between the two as regards the process of applying the developer to the exposed print.

“A. No, I have not made any practical tests, I have only studied the patents.

“Q. Then your statement with respect to the operation of the Gronau patent is merely your opinion, it is not based on any actual tests?

“A. Yes, that is true.

“Q. You have testified that according to the process of this Gronau patent and the Gronau device the developing liquid is impressed on the layer to be developer. Where in this patent [261] is that stated?

Mr. WHITE: I will stipulate there is no statement of that character in the Gronau patent.

“Q. Now, will you please read the last sentence of the second paragraph of the translation of the Gronau patent.

“A. ‘It was demonstrated that this slight moistening of the paper is sufficient to allow a complete development of the picture in the shortest possible time by means of the gas used as a developer.’

“Q. Is it not true that by this sentence it is stated that the development of the picture or image as shown in the Gronau patent is by means of the gas used in the developer in the shortest possible time.

“A. Yes, it is.

(Testimony of Arthur Lazar.)

“Q. Is it not true that development by means of a gas is entirely different from a development by means of a liquid?

“A. Yes, that is true.

“Q. Will you please state whether and where in the Gronau patent there is described a method for saturating the surface of a diazo type print throughout its entire area with developing liquid, by spreading said liquid on said surface?

Mr. WHITE: I will stipulate that is not in the patent.

“Q. Will you state whether and where in the Gronau patent is described a method for saturating the surface of a diazo type print throughout its entire area with a developing liquid by first applying an excess of the liquid and immediately thereafter removing the same?

Mr. WHITE: I will also stipulate there is nothing in the patent to that effect.

“Q. Where in the Gronau patent is there a method described in which a developer containing any other substance than a volatile alkali is applied to a diazo type print? [262]

Mr. WHITE: I will stipulate also there is nothing in the patent in so many words to that effect.

“Q. Then as I understand you the Gronau patent does not describe a diazo type print where there is applied a thin film of liquid developer containing a non-volatile alkali, an azodyestuff component, or a reducing agent, or any combination or mixtures of those two substances?

(Testimony of Arthur Lazar.)

Mr. WHITE: I will stipulate that there is nothing in the Gronau patent giving a composition of a developer liquid. Does that cover it?

Mr. HOFFMAN: Yes.

“Q. I will now refer you to the first patent in suit, Plaintiffs’ Exhibit No. 1, and ask you to please read lines 55 to 63 of page 2 of this patent.

“A. ‘The invention is based on the observation that the discoloration of the background in all kinds of diazo type processes can be prevented even for extended periods if a reducing agent is added to the sensitive layer or during or after development of the picture.’

“Q. Please read line 63.

“A. ‘Preferred reducing agents are organic substances such as aldehydes, amino compounds’——

“Q. That is enough. Will you please state whether the words ‘preferred reducing agents’ in line 62 excludes those reducing agents which are not the preferred ones from the concept of the invention described in lines 55 to 61.

Mr. WHITE: I object to that question on the ground it is calling for a construction of the patent. This witness is not qualified to do that.

The COURT: Overruled; an exception.

“A. It would exclude them to me if I had practiced the process, because I would not even try other reducing agents, [263] but the ones stated as preferred, because they are liable to give me the best result.

(Testimony of Arthur Lazar.)

“Q. Doctor, the question I am asking you here is really an interpretation of the English language. We say in lines 55 to 63, broadly, that a reducing agent may be used which will prevent the discoloration and then in line 62 we state that the preferred ones are thus and so. Now, does that not mean that reducing agents in general may be used which have that property of arresting discoloration, but the preferred ones are thus and so?

“A. Yes, it means that, but there is a practical side to it.

“Q. Please stick to answering the question, that is all I asked you. So, Doctor, if that is the case, as I understand you, those reducing agents other than the preferred ones are not excluded by that statement?

“A. Yes, that is so.

“Q. Isn't it a fact that substances which are not organic substances are inorganic substances?

“A. Yes, that is true.

“Q. Doesn't this also apply to reducing agents?

“A. Certainly.

“Q. So, as I understand you, the organic reducing agents, according to lines 62 and 63 of page 2, the first patent in suit, are the preferred ones, and the inorganic reducing agents must be the not preferred ones, is that correct?

“A. Yes, that is correct.

“Q. So, as I understand you, the not-preferred reducing agents, not being excluded from the con-

(Testimony of Arthur Lazar.)

cept of the invention, and the not-preferred reducing agents being, as you stated before, the inorganic reducing agents, these inorganic reducing agents are not excluded from the concept in lines 55 to 61: Is that correct?

“A. Yes, that is correct. [264]

“Q. When they are not excluded they consequently are included, are they not?

“A. They are included by inference.

“Q. I again refer you to the Kogel patent, No. 1,444,469, Defendant's Exhibit C. Will you please refer to examples 1 and 8 and 9 of this patent? In these examples the development with a liquid is effected by treatment in a bath of such liquid: Is that correct?

“A. Yes, it is.

“Q. Is it not a fact that the treatment in a bath involves the treatment of both sides of the print with the liquid?

“A. Yes, it does.

“Q. Is it not a fact that a treatment in a bath involves the treatment with an excess of the liquid?

“A. Yes.

“Q. Is it not a fact that in the Kogel patent there is, apart from the bath development, only mentioned development by means of a gas, as, for instance, in the example 7?

Mr. WHITE: I will stipulate that that is correct.

“Q. Is it not a fact that a treatment with a gas

(Testimony of Arthur Lazar.)

as described in example 7, lines 38 and 39 on page 3, involves a treatment with an excess of the developing agent?

“A. Yes, it does.

“Q. I now call your attention to Plaintiffs' Exhibit No. 2, the second patent in suit. Is it not a fact that according to the method of the second patent in suit only the exposed surface is treated with a developing liquid?

“A. Yes.

“Q. Is it not a fact that in this respect the method of the Kogel patent is quite different from that of the second patent in suit?

“A. The method of applying the liquid is different. [265]

“Q. Is it not a fact that according to the method of the second patent in suit there is applied a certain quantity of the developer to the exposed surface, and that the inter-action between the developer and that surface takes place automatically after the application of the quantity of the developer: Is that correct?

“A. Yes.

“Q. Then is it not a fact that in this respect the method of the Kogel patent is quite different from that of the second patent in suit?

“A. In regard to the excess or to the quantity of the developer applied Kogel has the possibility of changing the concentration of his liquid so there

(Testimony of Arthur Lazar.)

would not be an excess on the paper to be developed. He, however, does not state anything about the mode of developing.

“Q. Does the Kogel patent state anything at all about applying only a certain quantity to the exposed surface?

“A. No, it does not.

“Q. Doctor, I hand you Plaintiffs' Exhibit No. 10, the Rathke article. Will you please read the second paragraph on page 2 of the translation down to the period in line 9?

“A. If a solution of thiourea is mixed in the cold with cupric chloride, as long as a precipitate forms, and a possible excess of the reagent is removed through a further small addition of thiourea, then a white precipitate of microscopical needles consisting of $\text{CSN}_2\text{H}_4 + \text{CuCl}$ in a strongly acid colorless liquid is obtained. This latter contains the combination of one molecule thiourea with one atom of chlorine, described by Claus, *Ann. Chem. Pharm.* 179, 139, which chlorine in our case has been given off of the cupric chloride in that the latter has been changed to cuprous chloride.”

“Q. Is it not a fact that it is here stated that cupric chloride is treated with thiourea and that the result is that cuprous [266] chloride is formed, which cuprous chloride is present in the addition compound mentioned in line 4 of this paragraph?

(Testimony of Arthur Lazar.)

“A. He does not say that cuprous chloride is present in the addition compound, he only gives the so-called Brutto formula of his precipitation.

“Q. Does it state in there that cupric chloride is treated with thiourea?

“A. Yes, it does.

“Q. I call your attention to line 4 of this paragraph, the formula CuCl , is that cuprous chloride?

“A. Yes, it is, but as I stated before, these two compounds have to be read together, they form one compound, according to the statement which Rathke makes later.

“Q. But that compound is the thiourea plus the addition, is it not?

“A. No, it is not. It is a new compound in which the copper has entered the thiourea complex. It is a thiourea copper complex compound according to Rathke's own statement.

Q. If it is not the addition compound, why is it written like it appears in line 4 of this article, $\text{CSN}_2\text{H}_4 + \text{CuCl}$?

“A. This is written as a so-called Brutto formula only giving the constituents of this new compound without saying anything about the constitution of the compounds, itself.

“Q. Is it not a fact that this paragraph states the colorless liquid which is obtained apart from the compound of thiourea and cuprous chloride is a combination of one molecule of thiourea with one atom of chlorine.

(Testimony of Arthur Lazar.)

“A. Yes, it does.

“Q. Is it not a fact that this paragraph states that this chlorine with which the thiourea has combined, as in this case, has been given off of the cupric chloride.

“A. Yes, that is true. [267]

“Q. Is it not a fact that this paragraph states that by thus giving off of the chlorine the cupric chloride has been changed to cuprous chloride?

“A. Yes, it has, in the same sense that I stated before, that the cuprous chloride is not present in the compound, it is only given as a symbol.

“Q. Is it not a fact that the change of cupric chloride to cuprous chloride involves a decrease of the non-metallic part, in this case the chlorine, of the cupric chloride?

“A. Yes, it does, if you consider the reaction cupric chloride to cuprous chloride in itself, that is, just by itself.

“Q. Is it not a fact that in this case the decrease of the nonmetallic part of the compound cupric chloride is caused by the thiourea?

“A. In the presence of thiourea a migration of the chlorine and of the copper takes place. The copper goes into the thiourea complex. The chlorine has to look for another place to go. One place is the thiourea compounds which in itself is a base and the chlorine is used to form the salt of this base. In the case of the supernatant liquid the salt-like compound of thiourea is formed.

(Testimony of Arthur Lazar.)

“Q. Does this compound and this liquid contain chlorine?

“A. Yes, it does. Any hydrochloric acid salt contains chlorine.

“Q. Does not this chlorine come from the cupric chloride?

“A. Certainly it does. As I stated before, it is only a migration of the chlorine.

“Q. Is it not a fact that a substance which can decrease the nonmetallic part of a compound is according to Mellor’s definition on page 506 of Plaintiffs’ Exhibit No. 9, and I call your attention to line 9 from the bottom of that page, ‘is a reducing agent’?

“A. Yes, I stated that before, that the sentence reads [268] ‘A reducing agent is a substance which can remove oxygen from other substances.’

“Q. And will you read No. 2?

“A. ‘Can decrease the non-metallic part of a compound.’

“Q. Is it not a fact that thus by this paragraph of the Rathke article it is shown that thiourea in decreasing the non-metallic part of the compound cupric chloride is a reducing agent, according to the definition of Mellor?

“A. It would be that if you could find cuprous chloride in the compound, but Rathke, himself, states he cannot find it.

“Q. But Doctor, does it not say that right here in paragraph 2 of the translation, that when thio-

(Testimony of Arthur Lazar.)

urea is mixed with cupric chloride you end up with a white precipitate which consists of thiourea plus cuprous chloride in a strongly acid colorless liquid, is obtained. This latter contains the combination of one molecule thiourea with one atom of chlorine, described by Claus, *Ann. Chem. Pharm.*, 179, 139, which chlorine in our case has been given off of the cupric chloride in that the latter has been changed to cuprous chloride. Does not that mean that the cupric chloride has been changed to cuprous chloride, and that in effecting this change the extra chlorine atom has been given off?

“A. This change in the cupric chloride is only an apparent change. The copper is not there any more as a chloride salt.

“Q. Pardon me Doctor, please answer the question either ‘Yes’ or ‘No.’ I am asking you what this particular paragraph says, not what your opinion is; I am asking you does that paragraph state what I have said, or does it not?

“A. May I hear the question again?

The COURT: Read the question, Mr. Reporter.

“A. No, it does not, because the copper has entered the thiourea complex and there is nothing left any more of cuprous [269] chloride salt. The chlorine has an entirely different function in this compound. That is according to Rathke’s own statement in a later paragraph.

“Q. I am only considering this particular paragraph, that is, paragraph 2, those nine lines of that

(Testimony of Arthur Lazar.)

paragraph, page 2, and I would like to have you please state to the Court whether that article states what I am going to read now, that when you take thiourea and you mix it with cupric chloride, then you get a white precipitate of microscopical needles, consisting of thiourea plus cuprous chloride, in a strongly acid colorless liquid, and that this addition compound of thiourea plus cuprous chloride contains a combination of one molecule of thiourea with one atom of chlorine, which chlorine in our case has been given off of the cupric chloride in that the latter has been changed to cuprous chloride. Does not that article say that?

“A. It states only a precipitate of $\text{CSN}_2\text{H}_4 + \text{CuCl}$; he could have written it just as well $\text{CSN}_2\text{H}_4\text{CuCl}$ without the plus.

“Q. Now, you have previously testified that the CuCl in line 4 was cuprous chloride, have you not?

“A. Yes.

“Q. What is the formula of cupric chloride?

“A. CuCl_2 .

“Q. If one of the atoms of the cupric chloride were given off and we got CuCl , that would be a decrease in the non-metallic part of this compound, would it not?

“A. Yes, it would be if the cuprous chloride could be found, but it cannot.

“Q. If that were so then according to Mellor's own definition which you have just read, it would be a reducing agent?

“A. Yes. [270]

(Testimony of Arthur Lazar.)

Redirect Examination

“Q. Doctor, will you refer to page 9 of this translation of Rathke’s article, point 4, and read that to the Court please—read the whole paragraph.

“A. ‘A solution of cuprous chloride in hydrochloric acid as well as in ammonia has, as is known, the property of absorbing carbon monoxide. The solution of its thiourea compound does not possess this property. A measured volume of the gas does not diminish in the least after having been 24 hours in contact with the solution. Also this seems to me to point to the fact that the cuprous chloride is as such here no longer really present.’”

“Q. That statement at the end of the paper supports your statement, does it not, that the cuprous chloride in the so-called formula of line 4, or paragraph 2 on page 2 does not indicate the presence of cuprous chloride in that compound?

“A. That is correct.

“Q. Doctor, will you state whether or not Rathke discusses thiourea as a reducing agent?

“A. He does not.

“Q. By reading and studying this article would you gather, from your experience as a scientist, that Rathke was giving to the world a treatise on reducing agents?

“A. No, not at all.

“Q. Or on the substance thiourea as a reducing agent?

“A. Not at all.

(Testimony of Arthur Lazar.)

“Q. Doctor, are you familiar with the publication on Organic Chemistry by Houben-Weyl, Method of Organic Chemistry?

“A. Yes, I am very well acquainted with that book.

“Q. Has that book a chapter on reducing agents?

“A. Yes, it has a very large chapter on reducing agents.

“Q. Have you looked over that chapter recently?

“A. Yes, I scrutinized this chapter very carefully in order [271] to find any evidence that thiourea is a reducing agent.

“Q. Did you find thiourea mentioned in that chapter of the Hand-book?

“A. No, I did not.

“Q. Did you find thiourea mentioned as a reducing agent in the work by Beilstein?

“A. No, I did not.

“Q. Do you find thiourea present in any of the literature referred to as a reducing agent?

“A. No, I have never in my whole practice encountered any reference to this alleged fact.

“Q. I now hand you Defendant's Exhibit C, and refer you to page 2, lines 30 to 33 of that patent, and ask you to read that statement to the Court.

The COURT: Is that in either of the patents in suit?

Mr. WHITE: That is in the Kogel patent that is in evidence as Defendant's Exhibit C; that is one of the prior art patents.

“A. From the light-sensitive layer prepared by

(Testimony of Arthur Lazar.)

the previously-described process negative pictures as well as positive ones can be obtained.

“Q. Now, will you refer to example 1 of this patent commencing at page 2 of line 104 and state whether or not that refers to a process of manufacturing a positive diazo-type print?

“A. The first example refers to the manufacture of a positive diazo type print.

“Q. Does it refer to a developing liquid and, if so, what is that developing liquid?

“A. Yes it refers to a developer consisting of an alkaline solution of resorcinol.

“Q. What is the substance resorcinol?

“A. Resorcinol is a phenol.

“Q. Is it an azodyestuff component? [272]

“A. Yes.

“Q. In example 2 of this patent, page 2, line 119, what does that refer to, is that a process of developing?

“A. Example 2 gives the process of manufacturing a negative print.

“Q. Doctor, refer to the drawing of this apparatus shown on page 2 of this Gronau patent, Defendant's Exhibit D, and state to the Court how the diazo-exposed print is inserted into this apparatus, especially with respect to the position of the diazo surface.

“A. The sensitized surface of the diazo points up—when this sensitized paper is put into this slot here to be carried around the sensitized surface

(Testimony of Arthur Lazar.)

points up and when it arrives here the bottom of the paper points up.

“Q. In other words, the diazo sensitive surface on the upper part faces up when it enters the apparatus and when it egresses from the apparatus the diazo sensitive surface is down, is that correct?

“A. That is true.

“Q. So that if there was any excess of development liquid falling back along the roller marked 2 in this drawing the excess would fall not upon the diazo surface, but upon the back of the paper: Is that correct?

“A. Yes.

“Q. Now, I wish you would refer to claim 1 of this patent on page 2 of the translation and state whether or not that claim refers to a developing liquid or a developing of gaseous fumes.

“A. Claim 1 refers only to a developer liquid.

“Q. Doctor, is it your opinion that the Gronau apparatus can apply a uniformly thin film of a diazo liquid, say of the character shown in example 1 of the Kogel patent, comprising an alkali and an azodyestuff component upon a diazo layer in the form of a uniformly thin film? [273]

“A. Yes, I think it can perform that function.

Mr. HOFFMAN: I object to that because he has already admitted on cross-examination that he has never made a test, and so he really does not know.

Mr. WHITE: I asked him if it was his opinion.

The COURT: Yes, it may stand; exception.

(Testimony of Arthur Lazar.)

Recross Examination

“Q. Doctor, there is one more question I would like to ask you, and that is with respect to this Gronau patent. You have previously testified on cross-examination that when you put the print in here there is some excess of the liquid that falls off of the belt down this way and that excess, when it falls off, falls along the periphery and will land on here, and will eventually collect on the back of this print, here.

“A. As I remember, I think I testified that by the squeezing action the liquid which is squeezed out here goes back along the periphery of the roller.

“Q. The squeezing at the juncture point of the roller 3 and the large roller 2 causes the excess liquid to fall down and pass along the periphery of the roller 2 and hit the back of the print, with the print ejecting at this point, you say?

“A. Yes, but I remember only about the liquid being squeezed out here between the belt and the big roller and running down here; we did not talk about this other roller.

“Q. I would like to have you say whether this print, after it has passed around this roller and is ready to be ejected at the point 7, whether the exposed surface, the developed surface is also not wetted by this liquid that is on this belt, here.

The COURT: In other words, is there any liquid on that belt? [274]

(Testimony of Arthur Lazar.)

“A. Yes, there is a very small amount of liquid left on the belt, but the paper leaves the belt right at this place and is ejected here.

“Q. If it has some liquid it also is wetted on the developed surface in addition to being wetted on the back side?

“A. The paper was squeezed between the roller and the belt, and whatever liquid can stay on the belt is perhaps negligible.

The COURT: “Q. In other words, you think it is practically all squeezed out?

“A. Yes.

The COURT: “Q. And there would be no liquid touching the face of the paper?

“A. Yes, aside from the fact that the paper is carried out of the system, because it has this guide, here, which makes it lift up, away from the belt

“Q. I think you testified that the print which comes out of the Gronau apparatus is almost dry—you gave this testimony on page 200 of the record. Now, what I would like to know is whether, regardless of whether the back or the face of the print is wetted the print will not be almost dry as it is ejected from that slot 7?

“A. According to Gronau's statement it is pretty nearly dry.

“Q. Now, you have previously stated that there were millions of reducing agents, and you spoke of Houben-Weyl. You have testified that there were

(Testimony of Arthur Lazar.)

millions of reducing agents. Does that Hand-book list all such reducing agents, do you know?

“A. No, I did not say that, I did not say it lists all of them, but it gives typical examples of reducing actions and the type of reducing agent used for bringing about the reducing action.

The COURT: “Q. It does not mention thiourea?

“A. It does not mention thiourea. [275]

“Q. Does it mention carbon?

“A. Yes, I suppose it mentions it in some place. I looked specifically for thiourea, so I would not remember all of the individual reducing agents.

“Q. Because thiourea is not listed in this hand-book, that is not conclusive proof that it is not a reducing agent, is it?

“A. Well, I would not say that. But I should say that at least the group of compounds would be mentioned in which thiourea was.

“Q. In a hand-book of that character it is impossible to list all of the reducing agents which are now known and which will be discovered?

“A. Yes, I believe so.

“Q. In the future?

“A. I believe so.

“Q. It is impossible to list all of those, is it not?

“A. Yes, that is true. [276]

DEPOSITION OF DR. JOSEF LOEVENICH.

The following Deposition of Dr. Josef Loevenich was taken in Germany on written Interrogatories and Cross-Interrogatories under a Commission issued by the District Court to a Notary Public in Koln (Cologne), Germany. For convenience of the Record on Appeal the Interrogatories and Cross-Interrogatories and the respective Answers thereto have been rearranged in serial order and are approved as to form by attorneys for the parties without waiver of any rights as related to the substance of the Deposition.

ASA G. KAZEBEER,
ARLINGTON C. WHITE,
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Attorneys for Plaintiffs.

My name is Dr. Josef Loevenich, 38 years old, residence Trajanstrasse 35, Cologne, Professor of Chemistry at the University of Cologne. I am both a citizen and resident of the German Republic. I am not familiar with the English language and particularly I am not familiar with the English language to such an extent that I can readily read and understand articles in the English language on chemical subjects without the use of a German-English Dictionary.

Begining in 1921 and until 1924 I was an assistant at the Chemical Institute of the University

(Deposition of Dr. Josef Loevenich.)

of Cologne; since 1925 I am Professor at the University of Cologne. My training was two special examinations for chemists and promotion to Ph.D on account of chemical dissertation. My experience with Diazo types has been that as Professor I was steadily reading lectures on organic dyestuffs and their application as well as courses in practical chemistry for students. Therefore, I had great opportunity to occupy myself with diazo compounds. Since 1929 I am also scientific and technical advisor for a large firm which manufactures Diazo print paper so that in this field also I have many years of experience. [277]

Interrogatory No. 5. Are you familiar with the preparation of diazo type paper generally and with developers therefor?

Answer. I am familiar with the preparation of diazo papers and developers therefor.

Interrogatory No. 6. Will you please state how, in general, diazo types are manufactured by the utilization of layers containing diazo compounds together with developers?

Answer. Diazo compounds and certain additional ingredients are dissolved in water and applied in a thin layer on paper, then dried and exposed to light under an original drawing, and after this, developed by a suitable equipment with a developer which consists of phenolic azo-components and soda or some other alkali.

(Deposition of Dr. Josef Loevenich.)

Interrogatory No. 7. Is it or is it not a fact that the background of diazo types, which are produced with some layers containing diazo compounds together with a developer, discolor after exposure and development?

Answer. It is a fact that the background of diazo types discolors sooner or later in storage, depending upon the kind of diazo compound and phenolic component used.

Cross-Interrogatories to Interrogatory No. 7

X 1. You are referring to positive diazo type prints, and to the white background of such prints, are you not?

Answer. Yes.

X 2. Positive diazo type prints may be produced by a process in which the exposed print, after treatment with the developer, is immediately allowed to dry, or is dried without previous or subsequent washing at all, or by a process in which the exposed print, after treatment with the developer, is washed thoroughly and then dried. Is that correct?

Answer. Yes.

X 3. The white background of positive diazo type prints which are produced by the process in which the exposed print, after treatment with the developer, is washed thoroughly and then dried, does not discolor to any noticeable extent because the washing removed the causes which result in the discoloration, namely, the decomposition product resulting from the decomposition of the diazo com-

(Deposition of Dr. Josef Loevenich.)

pound contained in the sensitive layer of the copying paper after exposure under the transparent [278] drawing of which a positive print is desired, and any excess of azo dyestuff coupling component and of alkali not used up in the development. Is that correct?

Answer. The washing alone does not prevent the paper from discoloring on long storage. The Phenol used for the developing as well as the Phenol formed from diazo compounds by light exposure can only be removed to a small extent, since Phenols similar to non-fading dyes are partially absorbed into the paper fibre.

X 4. The white background of positive diazo type prints which are produced by the process in which the exposed print, after treatment with the developer, is immediately allowed to dry or is dried without previous or subsequent washing at all, does discolor after a short period of time under normal conditions of keeping or storage, because the causes which result in the discoloration, namely, the decomposition product resulting from the decomposition of the diazo compound contained in the sensitive layer of the copying paper after exposure under the transparent drawing or picture of which a positive print is desired, and the excess of azo dyestuff coupling component and of alkali not used up in the development have not been removed. Is that correct?

(Deposition of Dr. Josef Loevenich.)

Answer. It is true that the cause of discoloration of the background of diazo types exists in the Phenol formed by the decomposition of diazo compounds by light exposure, as well as by the azo-component applied to the paper by the developer. In regards to alkali not used up in the developing process, it is to be remarked that this alkali excess is eliminated by suitable additions to the paper itself and to the solution of the diazo type compound. The papers therefore react acid shortly after the developing, whereby the tendency to yellow is considerably reduced.

X 5. Is it not a fact that this discoloration of the white background of positive diazo type prints exists only with positive diazo type prints which have been made by a process in which the exposed print, after treatment with the developer, is immediately allowed to dry or is dried without previous or subsequent washing at all, and that such discoloration takes place only after and during storage of such diazo type prints for record purposes?

Answer. In regard to the first part of this chapter, I refer to my answer to Point 3. In regard to the last part, I say that evidently such a discoloration of diazo prints takes place only on long storage. [279]

Interrogatory No. 8. Do you know whether or not means have been employed in the art of arresting the discoloration of the background of diazo types?

(Deposition of Dr. Josef Loevenich.)

Answer. I know that substances have been used to prevent discoloration of the background of diazo types.

Cross-Interrogatories to Interrogatory No. 8

X 1. You are referring to positive diazo type prints, and to the white background of such prints, are you not?

Answer. Yes.

X 2. Positive diazo type prints may be produced by a process in which the exposed print, after treatment with the developer, is immediately allowed to dry, or is dried without previous or subsequent washing at all, or by a process in which the exposed print, after treatment with the developer, is washed thoroughly and then dried. Is that correct?

Answer. Yes.

X 3. If your answer to this interrogatory is that "YOU DO KNOW", do you mean that you do know the means have been employed in the diazo type art for arresting the discoloration of the white background of positive diazo type prints obtained by either of the processes set forth in question X 2, or do you mean that you do know that means have been employed in the diazo type art for arresting the discoloration of the white background of positive diazo type prints obtained only by the process set forth in question X 2 in which there is no washing of the exposed print before or after said print is allowed to dry or is dried?

Answer. * * *.

(Deposition of Dr. Josef Loevenich.)

X 4. If your answer to question X 3 is that you mean that you do know that means have been employed in the diazo type art for arresting the discoloration of the white background of positive diazo type prints obtained only by the process set forth in question X 2 in which there is no washing of the exposed print before or after said print is allowed to dry or is dried, what is the specific means?

Answer. Such ingredients are chemical compounds.

X 5. Is the specific means a chemical compound or compounds, and if so, name such compound or compounds.

Answer. Such ingredients are Thiosulphate, Thiourea, and oxyacids such as Tartaric Acid and Citric Acid. [280]

X 6. If a chemical compound or compounds, is such compound or compounds employed in the art for the express purpose of arresting the discoloration of the white background of the finished positive diazo type print during normal conditions of storage or keeping?

Answer. Yes.

X 7. If a chemical compound or compounds, do or do not such compound or compounds, when present in the white background of the finished diazo type print, exhibit the combined properties of being a reducing agent and of being capable of arresting the discoloration of said white background during normal conditions of storage or keeping?

(Deposition of Dr. Josef Loevenich.)

Answer. Some of these ingredients are reducing agents; some are not.

X 8. If your answer to question X 7 is in the affirmative, is or is not such answer merely your opinion based upon your general knowledge of chemistry, or based upon actual tests, and if based on actual tests, describe in detail such tests and the results obtained.

Answer. The affirmative answer on Question No. 7 is not only my own opinion, which is based on general knowledge of chemistry, but it is also based on actual tests. I do not contest that Sodium Thio-sulphate, Tartaric Acid and Citric Acid react as reducing agents on the paper. As far as Thiourea is concerned, I have made the following test: When diazo compounds are exposed to light, it is known that Phenols are formed. As an example, p-Oxydiphenylamin is formed by the diazo compound p-Amenodiphenylamin. This p-Oxydiphenylamin oxidizes under the influence of air or light partially to Quinonmonoanil, which is yellow to brownish in a thin layer on the paper, and as a substance is of a red color.

Formula — $\langle \text{---} \rangle$ — N = $\langle \text{= =} \rangle$ = O

This colored oxidation product causes the undesirable discoloration of the background on light-exposed and developed diazo types. Thiourea does not prevent this discoloration by reducing the oxydation compound, but by primarily entering into an addition compound with the p-Oxydiphenylamin. This

(Deposition of Dr. Josef Loevenich.)

addition compound is much less susceptible to oxidation by light. In order to find out whether Thiourea acts as a reducing agent or not, I have made the following test in a test tube. I have added to an aqueous hydro-chloric suspension of p-Oxydiphenylamin, a solution of hydrogen peroxide, whereby the solution is colored dark green, and the undissolved p-Oxydiphenylamin turns black. Then I made another experiment, in which I [281] added to the hydrochloric suspension a certain amount of Thiourea prior to the solution of hydrogen peroxide. In this case neither a green coloration of the solution, nor blackening of the undissolved p-Oxydiphenylamin took place, not even when I added hydrogen peroxide in excess. If Thiourea were a reducing agent, the hydrogen peroxide would oxidize first the Thiourea, and after this the p-Oxydiphenylamin. A green coloration of the solution should then take place, but this was not the case. Therefore, Thiourea cannot be a reducing agent.

X 9. If your answer to question X 7 is in the affirmative, state how such compound or compounds have been introduced into the white background of the finished positive diazo type prints. By this is meant at what stage or stages in the process of making the diazo type prints is such compound or compounds introduced.

Answer. The introduction of such components takes place both on applying the diazo solution to the paper (Thiourea, Tartaric Acid, Citric Acid) or

(Deposition of Dr. Josef Loevenich.)

when the developing solution is applied on the light-exposed print (Thiourea, Thiosulphate).

X 10. Are your answers to questions X 4, X 5, and X 9, based upon knowledge gained prior to or after February 10, 1927?

Answer. I acquired this knowledge after February 10th, 1927. It was not until 1929 that I occupied myself with the manufacture of diazo types.

X 11. If your answer to question X 10 is "UPON KNOWLEDGE GAINED PRIOR TO FEBRUARY 10, 1927", name the publication or publications, that is, patent or periodical, or both, which disclose the addition of means for arresting the discoloration of the white background of the finished positive diazo type print, date or dates of publication, and where found.

Answer. The application of Tartaric and Citric Acids is already described in the Danish Patent 33465 of November 16, 1922, published June 21, 1924. The use of Thiourea for diazo types for the prevention of the yellowing of the background has been disclosed for the first time by the German Patent Application of Kalle and Company No. K-108076, published August 11, 1928 (German Patent No. 526370 published May 6, 1931. Furthermore, in December 1928 it is described in the periodical "Journal de la Drogerie et la Revue Chimique, Bruxeues", Page 553, that Thiourea can be used for the prevention of the discoloration of the background. The use of other ingredients for arresting discoloration of the white background of finished

(Deposition of Dr. Josef Loevenich.)

positive diazo types has become known to me from Patents and Applications of the Van der Grintens.

[282]

Interrogatory No. 9. In United States Letters Patent No. 1,821,281, issued on September 1, 1931, it is stated that: "The invention is based on the observation that the discoloration of the background in all kinds of diazotype processes can be prevented even for extended periods if a reducing agent is added to the sensitive layer, or during or after development of the picture. Preferred reducing agents are organic substances such as aldehydes, amino compounds, aliphatic amido-compounds, poly-oxy-compounds or the like, and the reducing agents are preferably used together with very small quantities of the substances with catalytic action defined as 'anti-oxygenes' by Moureau", now will you please state whether you are familiar with the use in diazo type processes of means or agents of the character referred to in the above quoted excerpt from the aforementioned Letters Patent?

Answer. The content of U. S. A. Patent #1,821,281 is known to me from translation. I am familiar with the application of the ingredients cited in the Patent #1,821,281, in Question #9. However, I would like to emphasize that several of the cited compounds, as for instance amino compounds, and others, are not reducing agents, and that on the other hand real reducing agents cannot prevent the discoloration of the paper.

Interrogatory No. 10. Are you familiar with the use of substances, other than those mentioned in

(Deposition of Dr. Josef Loevenich.)

the last interrogatory, for arresting the discoloration of the background of diazo type prints and, if so, kindly state these substances?

Answer. Yes, these substances are Thiourea, Formaldehyde and its derivatives, as well as Tartaric Acid and Citric Acid.

Cross-Interrogatories to Interrogatory No. 10.

If your answer to this interrogatory is in the affirmative, please answer the following interrogatories.

X 1. Is your answer merely your opinion based on your general knowledge of the diazo type art?

Answer. Yes. [283]

X 2. Is your answer based upon actual tests with each and every one of the substances which you may have named, and if so, describe in detail each test and result obtained.

Answer. Yes. I have made such innumerable tests during the last 5 years with these substances that it is impossible to cite them all. All of these tests show that the substances named by me in the answer to Question #10 can arrest the discoloration of the background of diazo types on longer or shorter storage.

X 3. Do each and every one of the substances which you may have named exert the combined properties of being a reducing agent and of being capable of arresting under normal conditions of storage or keeping, the discoloration of the white background of the finished positive diazo type print, when present in such background?

(Deposition of Dr. Josef Loevenich.)

Answer. No. Not all substances are also simultaneously reducing agents.

X 4. If your answer to question X 3 is in the affirmative, is or is not such answer merely your opinion based upon your general knowledge of the diazo types, or based upon actual tests, and if based on actual tests, describe in detail such tests and the results obtained.

Answer. * * * .

X 5. If your answer to question X 3 is in the affirmative, is or is not such answer based upon your general knowledge of the diazo types gained prior to or after February 10, 1927?

Answer. * * * .

X 6. If your answer to question X 5 is "UPON KNOWLEDGE GAINED PRIOR TO FEBRUARY 10, 1927", name the publication or publications, that is, patent or periodical, or both, which disclose the use of any of the named substances for arresting the discoloration of the white background of the finished diazo type print, date or dates of publication, and where found.

Answer. * * * .

If you have named tartaric acid as one of the substances, please answer the following questions:

[284]

X 7. In the prior art, there is described a process for making positive diazo type prints which comprises applying to a paper a light-sensitive layer

(Deposition of Dr. Josef Loevenich.)

containing the diazo compound, an azo dyestuff coupling component and tartaric acid, exposing the sensitive layer under a transparent positive drawing or picture of which a print is desired, and developing the exposed layer with an alkali solution. Is not this process your basis for naming tartaric acid as a substance for arresting the discoloration of the background of diazo type prints?

Answer. Yes.

X 8. In the process as set forth in question X 7, where the sensitive layer contains both the diazo compound and the azo dyestuff coupling component, it is necessary to have acid present in the layer to make it acid in order to prevent the diazo compound and the azo dyestuff coupling component reacting together to form a dyestuff (color) and thus destroy the light-sensitivity of the layer. Is that correct?

Answer. Yes.

X 9. If the light-sensitive layer of the process as described in question X 7 were neutral or alkaline, the diazo compound and the azo dyestuff coupling component would react together to form a dyestuff (color) and thus destroy the light-sensitivity of the layer. Is that correct?

Answer. Yes.

X 10. Is it not a fact that the tartaric acid present in the sensitive layer of the process set forth in question X 7 is for the express purpose of retaining both the diazo compound and the azo dyestuff coupling component in their original state,

(Deposition of Dr. Josef Loevenich.)

that is, preventing the premature coupling of the diazo compound with the azo dyestuff coupling component?

Answer. No. Tartaric Acid does not serve for keeping the paper on the acid side and thus preventing a premature coupling, but it serves in the first place to diminish the discoloration of the background. If Tartaric Acid would serve only the first named purpose, it could be replaced by much cheaper acids or acid salts, such as Boric Acid, Potassium-Bisulphate, etc. However, with the latter compounds discoloration of the background of diazo types is not arrested.

X 11. Is it not a fact that the quantity of tartaric acid present in the sensitive layer of the process set forth in question X 7 is just sufficient to make the layer acid? [285]

Answer. The quantity of Tartaric acid used is without consequence.

X 12. Is or is not the small quantity of tartaric acid present in the sensitive layer for preventing premature coupling of the diazo compound with the azo dyestuff coupling component, of the process of making positive diazo type prints as set forth in question X 7, used up entirely in the development with alkali, and so there is no tartaric acid present in the background of the finished print?

Answer. The Tartaric Acid is converted into Alkali Tartrate during the developing process so that Tartaric Acid is not used up but only deprived of

(Deposition of Dr. Josef Loevenich.)

its acid character by formation of a salt. This could be confirmed with tests because by treating the developed print with water I could always prove the presence of Tartaric Acid salts.

X 13. If your answer to question X 12 is "IT IS NOT", is such answer merely your opinion, or is it based upon actual test, and if based on actual test, describe in detail the tests made and the results obtained?

Answer. See answer to preceding question.

X 14. Does or does not the white background of the positive diazo type print, made by the process as set forth in question X 7, discolor when stored for extended periods under normal conditions of keeping, as by placing the print in a desk drawer, in a filing cabinet or the like?

Answer. The white background discolors much slower in storage in the presence of Tartaric Acid than without Tartaric Acid.

X 15. If your answer to question X 14 is "IT DOES NOT", is such answer merely your opinion, or is it based upon actual test, and if based on actual test, describe in detail the tests made and the results obtained.

Answer. I have made prints with and without Tartaric Acid. When these prints are exposed to the daylight, or when they are stored for some time in the dark, the ones with Tartaric Acid discolor much less than the ones without Tartaric Acid.

If you have named formaldehyde as one of the substances, please answer the following questions:

(Deposition of Dr. Josef Loevenich.)

X 16. In the prior art, there is described a process for making positive diazo type prints which comprises sizing the paper with gelatine, hardening the gelatine with formaldehyde, applying to a surface of the sized paper a sensitive layer containing diazocarbazol as the diazo compound, exposing the sensitive layer under a transparent positive drawing or picture of which a print is desired, and developing the exposed layer with an alkaline liquid containing an azo dyestuff coupling component. Is not this process your basis for naming formaldehyde as a substance for arresting the discoloration of the background of diazo type prints?

Answer. Yes.

X-17. In the process as set forth in question X 16, is it not true that the formaldehyde is for the express purpose of hardening the gelatine sizing?

Answer. Formaldehyde was first added for this purpose only. Any excess present affects the background after the developing of the paper and prevents its discoloration as mentioned in the literature.

X 18. Is it not also true that in the process as set forth in question X 16, the quantity of formaldehyde used is only that required to effect the hardening of the gelatine sizing?

Answer. No, because the quantity of formaldehyde necessary for hardening of the gelatin layer cannot be determined accurately, so that there is mostly an excess present.

(Deposition of Dr. Josef Loevenich.)

X 19. Does or does not the white background of the positive diazo type print, made by the process as set forth in question X 16, discolor when stored for extended periods under normal conditions of keeping, as by placing the print in a desk drawer, in a filing cabinet and the like?

Answer. The discoloration of the background is prevented for a short time by formaldehyde. However, not nearly as well nor as permanently as by other substances.

X 20. If your answer to question X 19 is "IT DOES NOT", is such answer merely your opinion, or is it based upon actual test, and if based on actual test, describe in detail the tests made and the results obtained. [287]

Answer.

Interrogatory No. 11. Will you please define the substance thiocarbamide?

Answer. Thiourea is the diamid of the hypothetical Thio-carbonic Acid.

Interrogatory No. 12. Is thiocarbamide also known as thiourea?

Answer. Yes.

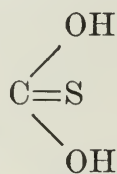
Interrogatory No. 13. Is thiocarbamide an aldehyde?

Answer. No.

Interrogatory No. 14. Is thiocarbamide an amino compound?

(Deposition of Dr. Josef Loevenich.)

Answer. Thiourea is the diamid of the hypothetical Thio-carbonic Acid of the Formula



It is also a diamid and not an amino or amido compound in the strict sense of the word.

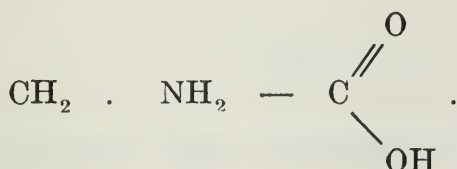
Cross-Interrogatories to Interrogatory No. 14

If your answer to interrogatory No. 14 is "NO", please answer the following interrogatories.

X 1. In your country, the terms "amino compound" and "amido compound" have different meanings. Is that correct?

Answer. In our country, these expressions do not differ in their significance.

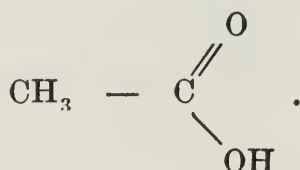
X 2. In your country, the term "amino compound" means a compound in which the amino —NH_2 —group is attached to a radical other than an acid radical, as for example, amino acetic acid of the formula



Is that correct?

Answer. This is correct.

X 3. Amino asetic acid is a derivative of acetic acid of the formula

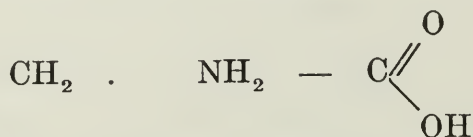


Is that correct?

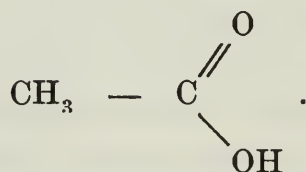
Answer. Yes.

(Deposition of Dr. Josef Loevenich.)

X 4. Is it not a fact that the only difference between amino acetic acid of the formula



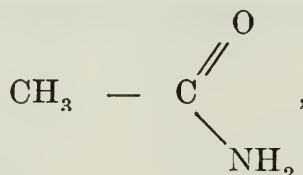
and acetic acid of the formula



is the substitution of the amino— NH_2 group for one of H's of the alkyl radical (CH_3), a radical other than an acid radical, in acetic acid?

Answer. This is a fact.

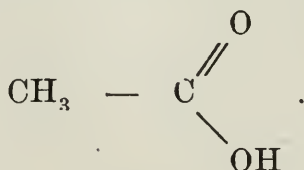
X 5. In your country, the term “amido compound” means a compound in which the amino— NH_2 group is a part of a radical of acid character, as for example, acetamide of the formula as follows:



Is that correct?

Answer. No. We designate such compounds as acid amids.

X 6. Acetamide is a derivative of acetic acid of the formula

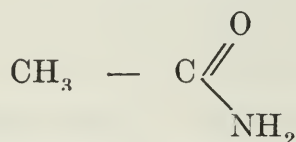


Is that correct?

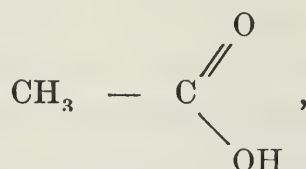
(Deposition of Dr. Josef Loevenich.)

Answer. Yes.

X 7. Is it not a fact that the only difference between acetamide of the formula

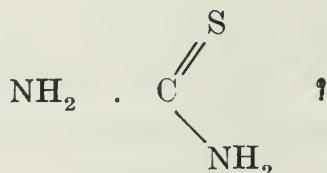


and acetic acid of the formula



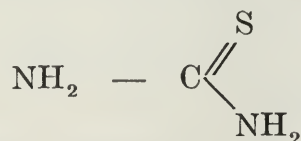
is the substitution of the amino group NH_2 for the hydroxyl oxygen (OH) in the carboxyl acid radical $-\text{COOH}$ of acetic acid? [289]

X 8. Is it not a fact that thiocarbamide (thiourea) is also known as amino thio formic acid amide which amide has the constitution formula of



Answer. No.

X 9. Is it not a fact that amino thio formic acid amide and thiocarbamide (thiourea) have the same constitution formula, namely



and so are one and the same compound?

Answer. Yes. These compounds although having the same constitutional formula need not be the

(Deposition of Dr. Josef Loevenich.)

same compounds because when the hydrogen directly connected with the carbon-atom in Formic Acid is substituted by NH_2 we are dealing with a genuine amino acid. However, this amino acid does not split off ammonia when treated with alkali. Therefore, if Thiourea were a derivative of the amino Thioformic acid, it should split off only 1 amino group when treated with alkali, namely, the one which has substituted the Hydroxyl group next to the Carbon-atom. Contrary to this, Thiourea when treated with alkali is saponified to Potassium Carbonate, Potassium Sulphydrate, Potassium thiocyanate and Ammonia. Hence a saponification takes place here which never happens with Aliphatic amino compounds and amino acids. This saponification is solely characteristic of acid amids. Incidentally, I would like to state that it has not been possible as yet to prepare amino Thioformic acid.

X 10. Is it not a fact that amino thioformic acid amide is a derivative of formic acid which acid has the formula, namely, H.COOH ?

Answer. Yes.

X 11. Is it not a fact that formic acid is made up of a carboxyl acid— COOH group and the element hydrogen commonly designated by the symbol H which is not a part of said carboxyl— COOH group?

Answer: Yes. [290]

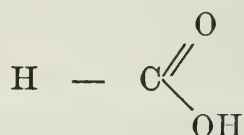
X 12. Is it not a fact that the carboxyl COOH group consists of a carbonyl oxygen, and O next

(Deposition of Dr. Josef Loevenich.)

to the C in the carboxyl group, and the hydroxyl oxygen designated by the symbol OH?

Answer. Yes.

X 13. The structural formula of formic acid is



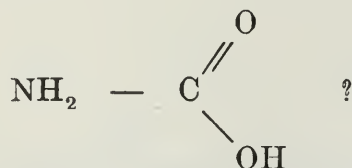
Is that correct?

Answer. Yes.

X 14. The formula given in question X 13 shows that C (Carbon) has four bonds, all of which are satisfied. Is that correct?

Answer. Yes.

X 15. Is it not a fact that amino thio formic acid amide is a derivative of amino formic acid which acid has the constitution formula of

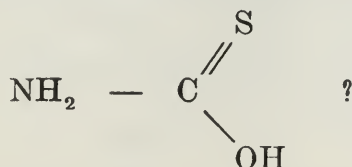


Answer. Yes.

X 16. Is it not true that amino formic acid is also known as carbamic acid?

Answer. Yes.

X 17. Is it not true that amino thio formic acid amide is a derivative of amino thio formic acid which acid has the constitution formula of



Answer. Yes.

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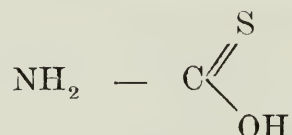
X 18. Is it not a fact that the constitution formula given in question X 17 is that of amino-mono-thio formic acid, and that sulfur, commonly designated by the symbol S, has replaced the carbonyl oxygen of the carboxyl—COOH group?

Answer. Yes.

X 19. Is it not a fact that the only difference between the amino formic acid of the formula set out in question X 15 and the amino thio formic acid of the formula set out in question X 17 is the substitution of sulfur (S) for the carbonyl oxygen O, the O opposite the double bond in the formula of amino formic acid?

Answer. Yes. [291]

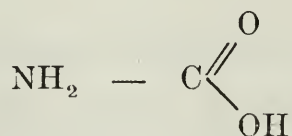
X 20. Is it not true that amino thio formic acid of the formula



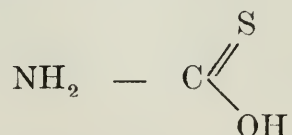
is also known as thiocarbamic acid?

Answer. Yes.

X 21. Is it not a fact that in amino formic acid of the formula of



and in amino thio formic acid of the formula of

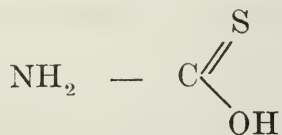


the NH₂ amino group is not a part of the acid radical?

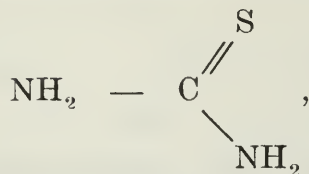
Answer. Yes.

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X 22. Is it not a fact that the only difference between amino thio formic acid of the formula



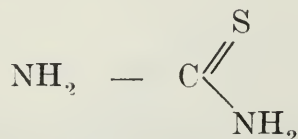
and amino thio formic acid amide of the formula



is the substitution of the group NH_2 for the hydroxyl oxygen (OH), the OH opposite the single bond in the formula of amino thio formic acid?

Answer. Yes.

X 23. Is it not a fact that in amino thio formic acid amide of the formula



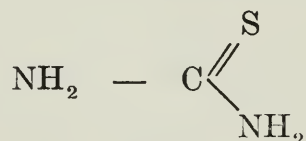
there is an amino NH_2 group which is not a part of the acid radical and another amino NH_2 group which is a part of the acid radical?

Answer. It is theoretically correct that in the amino Thioformic-acid-amid one amino group functions as a part of the acid radical and another NH_2 group is not a part of this acid radical. The amino Thioformic acid, however, is by no means identical with Thiourea, because in this case the 2 amino groups in the Thiourea would have to show dis-

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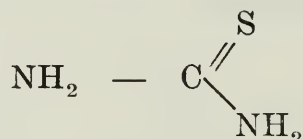
tinctly different reactions which is not the case. This has already been discussed in Point 9 of Question 14. (See behavior of Thiourea against Potassium Hydroxide.) [292]

X 24. Is it not a fact that a compound such as amino thio formic acid amide of the formula



which has one amino NH_2 group that is not a part of the acid radical, and another amino NH_2 group that is a part of the acid radical, may be correctly termed either an amino compound or an amido compound?

Answer. Yes, if the compound of the formula



is considered as amino Thioformic acid amid. This compound, however, exists only as Thiourea, which is known, as mentioned in item 9, to react like a regular acid amid, and not like an amino acid and an acid amid simultaneously.

X 25. Please state whether or not in the United States the terms "amino compound" and "amido compound" have the same meaning as in your country?

Answer. I assume that this is right, because according to the Geneva Nomenclature there is no difference between amino and amido compounds.

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X 26. Please state whether or not in the United States the terms "amino compound" and "amido compound" are used interchangeably and hence mean one and the same thing.

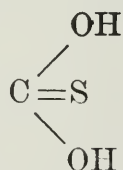
Answer. See preceding answer.

X 27. Is it not a fact that thiocarbamide is an aliphatic compound?

Answer. Yes.

Interrogatory No. 15. Is thiocarbamide an aliphatic amido-compound?

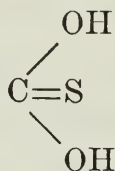
Answer. Thiourea is not an Aliphatic Amino compound, but the acid diamid of the hypothetical Thio-carbonic acid of the formula



It also is in line with the chemical behavior of Thiourea that it must be considered a derivative of this hypothetical Thio-carbonic acid because the two Hydroxyl groups are substituted by the NH_2 groups, [293] the same as in any acid amid. As an example, when Alkalis such as Potassium Hydroxide act on acid amid, the NH_2 group is saponified and substituted by the Hydroxyl group under reformation of the original acid and free ammonia. Thiourea shows the same behavior when treated with Potassium Hydroxide, whereby Ammonia, Potassium Carbonate, Potassium Sulph-hydrate and Potassium Thiocyanate are formed. The latter prod-

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ucts have to be considered as the decomposition products of the Thiocarbonic acid of the formula



which in itself has never been isolated.

Interrogatory No. 16: Is thiocarbamide a poly-oxy-compound?

Answer. No.

Interrogatory No. 17. Is thiocarbamide a reducing agent in the general chemical sense and explain your answer.

Answer. No. Thiourea is not a reducing agent in the general chemical sense, because Thiourea does not show the reactions which are generally characteristic of reducing agents; for instance, it does not reduce Ammoniacal Silver Nitrate solution and Mercuric Chloride solution. Not even Chromium Chloride solutions or Palladium Chloride solutions are reduced when heated. Thiourea only forms salt-like addition compounds with these salts, but does not reduce them in any way. Also, in the handbooks of Organic Chemistry, as for instance in Houben-Weyl Methods of Organic Chemistry, Thiourea is not mentioned in the group dealing with reducing agents.

Cross-Interrogatories to Interrogatory No. 17

If your answer to interrogatory No. 17 is "NO", please answer the following interrogatories:

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X 1. Is your statement that thiocarbamide is not a reducing agent in the general chemical sense merely your opinion?

Answer. No.

X 2. Is your statement that thiocarbamide is not a reducing agent in the general chemical sense supported by any well known chemical authorities, and if so, name such authorities? [294]

Answer. From the fact that in the handbooks of Organic Chemistry, in Houben-Weyl Methods of Organic Chemistry, under table of reducing agents, Thiourea is not cited at all, it is evident that Thiourea is not a reducing agent in the general chemical sense. I would like to state that in this fundamental publication of organic chemistry, all reducing agents are enumerated which ever have been or could be used in organic chemistry. The contributors to this handbook of Organic Chemistry by Houben-Weyl are the foremost scientists of chemistry in Germany.

X 3. Is your statement that thiocarbamide is not a reducing agent in the general chemical sense based upon actual tests, and if so, describe in detail the tests and the results obtained.

Answer. Thiourea is not a reducing agent either in the general chemical sense or in this special case, in diazo type processes. This, my opinion, is supported by the following test. Thiourea does not give reactions generally characteristic of reducing agents; as an example, it does not reduce Ammo-

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niacal Silver Nitrate solution, or Mercuric Chloride solution. Not even Chromic Chloride solutions of Palladium Chloride solutions when heated. Thiourea gives with these salts only salt-like addition compounds but does not reduce them in any way. Also in the handbooks of Organic Chemistry, for instance in Houben-Weyl Methods of Organic Chemistry, Thiourea is not mentioned in the group of reducing agents. From the following test it is evident that Thiourea does not act as a reducing agent in diazo prints either. It is known that on exposure to light a Phenol is formed from the Diazo compound applied on the paper. As an example, p-Oxydiphenylamin is formed from the diazo compound of p-Aminodyphenylamin. This p-Oxydiphenylamin oxidizes under the influence of light, partially to Quinonmonoanil of the Formula—



which in a thin layer on paper is yellow to brownish, but as a substance has a red color. This colored oxidation compound causes the discoloration of the background which is so undesirable in light-exposed and developed diazo types. Thiourea prevents this discoloration, not by reducing this oxidation product, but by entering primarily into an addition compound with p-oxidiphenylamin. This addition compound is much less susceptible to oxidation under light. Similar addition compounds of Thiourea, for instance with Oxalic Acid or Oxalic Acid Diethylester have been described by Nencki, Berichte 7,780.

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That this, my opinion, is correct, is evident from the following test which can be made in a test tube. The oxidation of [295] p-Oxydiphenylamin to Quinonmonoanil and other colored compounds can also be accomplished by hydrogen peroxide in hydrochloric solution. When hydrogen peroxide is added to an aqueous hydrochloric suspension of p-Oxydiphenylamin, the solution turns dark green, and the undissolved p-Oxydiphenylamin turns black. However, when Thiourea is previously added to the hydro-chloric suspension, hydrogen peroxide can be added ad libitum without a green respectively black coloration taking place. If Thiourea were a reducing agent, the hydrogen peroxide would first oxidize the Thiourea, and an excess of hydrogen peroxide after this would oxidize the p-Oxydiphenylamin. Since, however, even with a great excess of hydrogen peroxide, no oxidation of the p-Oxydiphenylamin takes place, Thiourea cannot be a reducing agent. When glucose is added instead of Thiourea to the hydrochloric suspension of p-Oxydiphenylamin, and after this hydrogen peroxide in excess, an oxidation of the p-Oxydiphenylamin takes place just the same, noticeable by the discoloration of the solution and a blackening of the undissolved p-Oxydiphenylamin. The same thing happens when Sodium Thiosulphate is added instead of glucose. This proves that the latter ones are actually reducing agents and also act on paper as such, contrary to Thiourea, which is no reducing agent, and does not act as such.

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X 4. Is it not a fact that a substance which can change the metal of a metal salt from the higher to the lower valence, as for example the cupric copper of a valence of two (2) to the cuprous copper of a valence of one (1), is a reducing agent?

Answer. Yes.

X 5. Is it not a fact that when an aqueous solution of glucose to which potassium hydroxide has been added is mixed with a solution of cupric sulfate of the formula of CuSO_4 , a deep blue liquid is obtained, and that when said blue liquid is boiled, a bright red precipitate of cuprous oxide of the formula of Cu_2O is deposited and the liquid becomes entirely colorless if sufficient glucose is present?

Answer. Yes, for glucose is a typical reducing agent.

X 6. Is it not a fact that the reaction set forth in question X 5 shows that glucose reduces the cupric copper of a valence of two (2) to the cuprous copper of a valence of one (1), and that therefore, glucose is a reducing agent? [296]

Answer. Yes.

X 7. Is it not a fact that the reaction set forth in question X 5 is a well known test for showing that glucose is a reducing agent?

Answer. Yes.

X 8. Is it not a fact that the reduction of the cupric copper of a valence of two (2) to the cuprous copper of a valence of one (1) is more easily effected in an alkaline or basic medium than in an acid medium?

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Answer. Yes.

X 9. In the reaction set forth in question X 5, the reduction of the cupric copper to cuprous copper is effected in an alkaline medium, that is, the medium or liquid is alkaline because of the presence of the base or alkali potassium hydroxide. Is that correct?

Answer. Yes.

X 10. Is it not true that thiocarbamide, when treated with certain metal salts, forms addition compounds consisting of thiocarbamide and the metal salt?

Answer. Yes, such compounds are known in great numbers.

X 11. Does or does not thiocarbamide, when treated with cupric chloride, form an addition compound consisting of thiocarbamide and said chloride?

Answer. Yes.

X 12. If your answer to question X 11 is "IT DOES NOT", is or is not such answer merely your opinion based upon your general knowledge of chemistry?

Answer. * * *

X 13. If your answer to question X 11 is "IT DOES NOT", is or is not such answer supported by authorities, and if so, name such authorities?

Answer. * * *

X 14. If your answer to question X 11 is "IT DOES NOT", is or is not such answer based upon

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actual tests, and if so, describe in detail such tests and the results obtained?

Answer. * * * [297]

X 15. If your answer to question X 11 is "IT DOES", does or does not the addition compound consist of thiocarbamide and cupric chloride of the formula $\text{CSN}_2\text{H}_4.\text{CuCl}_2$, or of thiocarbamide and cuprous chloride of the formula $\text{CSN}_2\text{H}_4.\text{CuCl}$?

Answer. In the literature only addition compounds of Thiourea and Cuprous Chloride of the Formula $\text{CSN}_2\text{H}_4 \text{ CuCl}$ are described.

X 16. If your answer to question X 15 is that the addition compound consists of thiocarbamide and cupric chloride of the formula $\text{CSN}_2\text{H}_4.\text{CuCl}_2$, is or is not such answer merely your opinion based upon your general knowledge of chemistry?

Answer. * * *.

X 17. If your answer to question X 15 is that the addition compound consists of thiocarbamide and cupric chloride of the formula $\text{CSN}_2\text{H}.\text{CuCl}_2$, is or is not such answer supported by any authorities or based upon actual tests, and if so, name such authorities or describe in detail such tests and the results obtained from the tests.

Answer. * * *.

X 18. Do you or do you not know that when a solution of thiocarbamide of the formula CSN_2H_4 is mixed at ordinary temperature with the blue colored solution of cupric chloride of the formula CuCl_2 , a white precipitate consisting of the addition

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compound of thiocarbamide and cuprous chloride of the formula $\text{CSN}_2\text{H}_4\cdot\text{CuCl}$ is deposited in an acid solution, and the color of the supernatant liquid (solution) changes from a blue to a colorless color?

Answer. It is known to me when adding to Thiourea an aqueous solution of Cupric Chloride a white precipitation is formed which consists of the addition compound of Thiourea and Cuprous Chloride. The fact that the super-natant liquid is not colored blue anymore is by no means due to the fact that cupric chloride present in excess is reduced to cuprous chloride but it is due to the fact that equi-molecular quantities have been used and therefore no copper ion is left in the solution. If an excess of Cupric Chloride is used, the blue color is retained after adding less than the equi-molecular quantity of Thiourea. This proves that the addition compound of Thiourea and Cuprous Chloride is formed, but that beyond this point a reduction of Cupric Chloride by Thiourea is out of the question. I would like to mention further that Cuprous Chloride is completely insoluble in water. [298]

X 19. Even if your answer to question X 18 is "YOU DO NOT KNOW", or "YOU DO KNOW", is or is not the change in color of the cupric chloride solution in the reaction set forth in question X 18, from a blue to a colorless color, analogous to the same change in color of the solution of cupric

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sulfate in the reaction set forth in question X 5; does or does not this change in color indicate a reduction of the cupric copper ion to the cuprous copper ion; and does or does not this reduction of copper establish that thiocarbamide is a reducing agent?

Answer. As already mentioned in the answer to question #18, there is by no means involved a reduction of the Cupric Chloride solution by Thiourea, but merely a formation of a complex compound in which the valence of the copper ion is very questionable. See also the publication of Kohlschutter and Brittlebank *Annalen der Chemie* 349, 232 (1906) and the publication of Pfeiffer about Organic Molecular Compounds, and his work published in 1922 under the same name. Alone from the fact that no oxidation product of Thiourea can be found in the solution, it is evident that no reduction is involved. In adding Thiourea to Cupric Chloride solution, and after the removal of the white precipitation consisting of an addition compound of Thiourea and Cuprous Chloride, oxidation products of Thiourea such as Sulphur, Carbon Dioxide and Ammonia should be found. However, neither myself nor other scientists have been able to find any proof of the presence of such oxidation compounds. Alkaline Cupric Sulphate solution shows an entirely different behavior towards Glucose; a reaction which is referred to in Question #5 and at this time. Glucose undoubtedly acts as

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a reducing agent on alkaline Cupric Sulphate solution, inasmuch as it precipitates red Cuprous oxide. The Glucose itself is hereby oxidized to the corresponding sugar acids, Gluconic Acid and Mannonic Acid, as well as various other oxidation products such as Carbon Dioxide and Formic Acid, which all have been found and identified. (Net, *Annalen der Chemie* 357 page 259, 1907.) Therefore, it is perfectly erroneous to regard these two reactions as equivalent.

X 20. Is it not a fact that it is more difficult to reduce the cupric salts in an acid medium than in an alkaline medium?

Answer. This question is superfluous because in an acid medium a reduction of Cupric Salts by organic substance is not known at all. [299]

X 21. Is it not a fact that a substance which can reduce the cupric salts in an acid medium is a good reducing agent?

Answer. If actually Thiourea were a reducing agent, the question would come up why other metal salt solutions which generally are much more easily reduced than cupric Chloride solutions are not reduced by Thiourea. I am referring here in the first place to Palladium Chloride solution, Alkaline Cupric Sulphate, Platinum Chloride and Ammoniacal Silver Nitrate solutions, and Gold Chloride solutions. It seems that the peculiar tendency of Cuprous Chloride to form complex compounds has a great deal to do with the peculiar reaction between

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Cupric Chloride solution and Thiourea solution, so therefore this reaction cannot be classified as a reduction.

X 22. Assuming that the reaction set forth in question X 18 is correct, does or does not such reaction show that thiocarbamide reduces a cupri (cupric) salt to a cupro (cuprous) salt in an acid medium?

Answer. The answer to this question could be dispensed with, because it has already been answered in Question #21.

X 23. Do you or do you not know that when the white precipitate, consisting of the addition compound of thiocarbamide and cuprous chloride of the formula $\text{CSN}_2\text{H}_4\cdot\text{CuCl}$ which is formed in the reaction set forth in question X 18, is boiled with diluted ammonia, it is decomposed into cyanamide and hydrochloric acid and cuprous sulfide, the cuprous sulfide, being deposited as a black precipitate?

Answer. The reaction here cited hardly proves that in the addition compound of Thiourea and Cupric Chloride, Cuprous Chloride is involved, because Thiourea is already saponified by heating with dilute ammonia.

X 24. Even if your answer to question X 23 is "YOU DO NOT KNOW", or "YOU DO KNOW", would or would not the formation of black cuprous sulfide resulting from the decomposition reaction set forth in question X 23 establish that the copper

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of the addition compound of thiocarbonate and copper chloride is the cuprous copper of a valence of one (1); and would or would not this also establish that thiocarbamide is a reducing agent?

Answer. No. Proof given in answer to Question #23. [300]

X 25. You are familiar with the publication *Berichte der Deutschen Chemischen Gesellschaft*, are you not?

Answer. Yes.

X 26. This *Berichte* publication is a treatise on Chemical compounds, is it not?

Answer. Yes.

X 27. This *Berichte* publication is recognized by chemists generally as an authoritative work on the subject of chemistry, is it not?

Answer. Yes.

X 28. Any description of a particular compound and its properties appearing in this *Berichte* publication would be accepted as an established fact. Is that correct?

Answer. The description of organic compounds and their properties in "*Berichte*" are considered as facts as long as they are not disproved by later research.

X 29. If the reactions set forth in questions X 18 and X 23 were described in this *Berichte* publication, such reactions would be accepted by chemists as established facts. Is that correct?

Answer. Even if the reactions propounded in Question #18 and #23 would have been described

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in "Berichte", scientists are entitled to interpret the reactions published according to their own conceptions, which might be different from those of the author of the publication.

Interrogatory No. 18. Is thiocarbamide a reducing agent in its action as an accessory material either in a light-sensitive layer applied on diazo type paper, or in a developer for such paper, or in the diazo print itself? Will you explain your answer?

Answer—Thiourea is neither a reducing agent in the general chemical sense, nor is it a reducing agent in special cases where it is added to a light sensitive layer consisting of diazo compounds, or in a developer for such paper, or in the diazo print itself. [301]

Interrogatory No. 19. Does thiocarbamide, when introduced into diazo type prints either by adding to the sensitive layer, to the developer therefor, or after development, arrest discoloration of the background of the diazo type prints and, if so, will you please state what reaction takes place by its introduction?

Answer. Yes, Thiourea prevents discoloration, for which I give the following explanation:

When Thiourea is added in appreciable quantities to the light sensitive layer of a diazo type paper, or when a developing liquid containing Thiourea is used for developing a light-exposed diazo type paper, it is found that in many cases the yel-

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lowing which takes place afterwards can be diminished appreciably. It is known that the same action can be obtained by adding the reducing agent Sodium Thiosulphate to the developer liquid used for the light-exposed diazo type paper. (I mention here only Thiosulphate as a reducing agent because all other reducing agents are practically useless when added to the light sensitive layer or the developer. Furthermore, in cases where they are usable, their action in the retarding of the yellowing of developed diazo prints is much inferior to that of both of the above-mentioned ingredients (Thiourea, Sodium Thiosulphate.)

It is evident from the following explanation that Thiourea does not act as a reducing agent in the reaction under discussion. It is known that the diazo compound on the paper is converted into a Phenol by exposure to light. As an example, p-Oxydiphenylamin is formed from the diazo compound of p-Aminodiphenylamin. This p-Oxydiphenylamin oxidizes under the influence of light, partially to Quinonmonoanil of the Formula—



which on paper in a thin layer appears yellow to brownish, but which in substance is of a red color. This colored oxidation product causes the very undesirable discoloration on the light-exposed and developed diazo type. Thiourea by no means prevents this discoloration by reducing the oxidation

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product, but by primarily entering into an addition compound with p-Oxydiphenylamin. This addition compound later is very much less oxidizable under the influence of light. Similar addition compounds of Thiourea, as an example with Oxalic Acid or Oxalic Diethylester have been described by Nencki, Berichte 7,780. That this, my opinion, is correct, is evident from the tests which can be made in a test tube: [302]

The oxidation of the p-Oxydiphenylamin to Quinonmonoanil and other colored compounds can also be brought about by hydrogen peroxide in hydrochloric acid solution—that is, when hydrogen peroxide is added to an aqueous hydro-chloric suspension of p-Oxydiphenylamin, the solution becomes dark green, but the undissolved p-Oxydiphenylamin turns black. However, when Thiourea is added previously to the hydro-chloric suspension, hydrogen peroxide can be added ad libitum without a green respectively black discoloration taking place. If Thiourea were a reducing agent, hydrogen peroxide would first oxidize the Thiourea and the excess of the hydrogen peroxide would have to oxidize the p-Oxydiphenylamin. However, since even with a great excess of hydrogen peroxide, an oxidation of the p-Oxydiphenylamin does not take place, Thiourea cannot be a reducing agent by any means. If instead of Thiourea, Sodium Thiosulphate is added to the hydro-chloric suspension of p-Oxydiphenylamin and after this hydrogen peroxide is added in

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excess, the oxidation of the p-Oxydiphenylamin takes place in spite of this as shown by the discoloration of the solution and the blackening of the p-Oxydiphenylamin. From this it can be seen that Sodium Thiosulphate is actually a reducing agent, and acts as such on the paper, contrary to Thiourea.

Interrogatory No. 20. Does thiocarbamide act as an anti-oxidant when used in either the diazo sensitive layer, the developer therefor or after development, in connection with the manufacture of diazo types? Will you explain your answer?

Answer. Thiourea does not act as an anti-oxidant. Thiourea has to be added in appreciable quantities to the light sensitive layer consisting of diazo compounds in order to prevent the yellowing of the finished print. $1\frac{1}{2}$ to 2 mols of Thiourea to 1 mol of diazo compound are practically necessary. This already shows that Thiourea, which is used here in quantities of 150 to 200% of the diazo compound, cannot have the character of an anti-oxidant in this particular case, because anti-oxidant bodies must be able to exercise their activities in minute quantities, that is, a fraction of one per cent. It can be seen from the work of the discoverer of the anti-oxidant action, Moreau "Sur L'autoxydation aux Comptes Rendus de L'academic des Sciences" Vol. 175 (1922- II) Page 128 Line 12 from below, that the numerical data about the quantity of anti-oxidant used by Moreau refers to pure Acroleine and that according to Table 2 on Page 129, the oxidation of the Acroleine can be

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practically inhibited by a quantity of anti-oxidant [303] between 1/40,000 and 1/100,000 of the anti-oxidant, which in this particular was hydro-quinone.

Cross-Interrogatories to Interrogatories

Nos. 18, 19 and 20.

X 1. The statement quoted in interrogatory No. 9, from United States Letters Patent No. 1,821,281, describes in general terms the invention of said Patent, does it not?

Answer. Yes.

X 2. The invention as described in the quoted paragraph from United States Letters Patent No. 1,821,281 in interrogatory No. 9 is that the discoloration of the white background of positive diazo type prints obtained by any of the known methods of producing such prints is prevented, even for extended periods, if a reducing agent is present in the white background of the finished diazo type prints, the reducing agent or agents being introduced into the background by adding same to the sensitive layer, or during or after development of the picture or the print. In other words, the invention is the production of positive diazo type prints which have a white background that does not discolor for extended periods of storage or keeping, by having a reducing agent present in said background that has the property of arresting this discoloration. Is that correct?

Answer. Yes. This is correct.

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X 3. Positive diazo type prints are produced by a process in which the exposed print, after treatment with the developer, is immediately allowed to dry, or is dried without previous or subsequent washing at all, or by a process in which the exposed print, after treatment with the developer, is washed thoroughly and then dried. Is that correct?

Answer. Yes. This is correct.

X 4. The white background of positive diazo type prints which are produced by the process in which the exposed print, after treatment with the developer, is washed thoroughly and then dried, does not discolor to any noticeable extent because the washing removes the causes which result in the discoloration, namely, the decomposition product resulting from the decomposition of the diazo compound contained in the sensitive layer of the copying paper after exposure under the transparent drawing of which a positive print is desired, and any excess of azo dyestuff coupling component and of alkali not used up in the development. Is that correct? [304]

Answer. No. According to my tests with different diazo compounds, neither the Phenol formed by decomposition of the diazo compound, nor the coupling component applied with the developer can be removed by long washing to any appreciable extent. Therefore also papers washed for a long time discolor after some ageing. This is due to the fact that the Phenols combine with the paper in a similar

(Deposition of Dr. Josef Loevenich.)

manner that non-fading dyes combine with cotton.

X 5. The white background of positive diazo type prints which are produced by the process in which the exposed print, after treatment with the developer, is immediately allowed to dry or is dried without previous or subsequent washing at all, does discolor after a short period of time under normal conditions of keeping or storage because the causes which result in the discoloration, namely, the decomposition product resulting from the decomposition of the diazo compound contained in the sensitive layer of the copying paper after exposure under the transparent drawing or picture of which a positive print is desired, and the excess of azo dyestuff coupling component and of alkali not used up in the development, have not been removed. Is that correct?

Answer. Yes.

X 6. Is it not a fact that this discoloration of the white background of positive diazo type prints exists only with positive diazo type prints which have been made by a process in which the exposed print, after treatment with the developer, is immediately allowed to dry or is dried without previous or subsequent washing at all, and that such discoloration takes place only after and during storage of such diazo type prints for record purposes?

Answer. Yes.

(Deposition of Dr. Josef Loevenich.)

X 7. Is it not a fact that the normal conditions under which positive diazo type prints are stored, or kept, include atmospheric influences such as air, light, etc?

Answer. Yes. [305]

X 8. Is it not a fact that this discoloration of the white background of positive diazo type prints obtained by a process in which the exposed print, after treatment with the developer, is immediately allowed to dry or is dried without previous or subsequent washing at all, is due to the chemical influence of air and light, during normal conditions of storage or keeping, upon the components, namely, the decomposition product resulting from the decomposition of the diazo compound contained in the sensitive layer of the copying paper after exposure under the transparent drawing of which a positive print is desired, and any excess of azo dyestuff coupling component and of alkali not used up in the development, present in the background of the positive diazo type prints?

Answer. Yes.

X 9. Assuming that two positive diazo type prints were made by the process in which the exposed print, after treatment with the developer, is immediately allowed to dry or is dried without previous or subsequent washing at all; and that both of such prints, as soon as they are made, are immediately stored in a vacuum, the one print being

(Deposition of Dr. Josef Loevenich.)

stored in a closed vessel through which light cannot penetrate and containing only a non-oxidizable gas like carbon dioxide of the formula of CO_2 , and the other print being stored in a closed vessel containing also the same non-oxidizable gas, but having walls which permit the free penetrations of of light there-through; and further that the white background of both of said prints, after an extended period of storage in a vacuum, showed no discoloration, would or would not these results indicate that the discoloration is due to the oxidizing action of the atmosphere upon the components, namely, the decomposition product resulting from the decomposition of the diazo compound contained in the sensitive layer of the copying paper after exposure under the transparent drawing of which a positive print is desired, and any excess of azo dyestuff coupling component and of alkali not used up in the development, present in the white background of the prints?

Answer. Yes.

X 10. If a positive diazo type print is made by the process in which the exposed print, after treatment with the developer, is immediately allowed to dry or is dried without previous or subsequent washing at all, and thiocarbamide is introduced into such print at some stage of said process, as for example by adding same to the sensitive layer, [306] or during or after development, as stated in the quoted paragraph from United States Letters

(Deposition of Dr. Josef Loevenich.)

Patent No. 1,821,281 in interrogatory No. 9, does or does not the white background of such print discolor when stored for extended periods under normal conditions of keeping, as by placing the print in a desk drawer, in a filing cabinet, or the like?

Answer. The fact cited here is correct only in so far as the addition of Thiourea is active by arresting the discoloration of the background of the paper—only when the paper reacts acid after developing, because when there is an alkaline reaction on the paper, Thiourea does not prevent discoloration of the background.

X 11. If your answer to question X 10 is “IT DOES NOT”, is such answer merely your opinion, or is it based upon actual tests, and if based on actual tests, describe in detail the tests made and the results obtained?

X 12. Assuming that the background of the positive diazo type print made by the process set out in question X 10 does not discolor or discolor to any noticeable extent, when stored for an extended period under normal conditions of keeping, does that not indicate that thiocarbamide exerts a reducing action upon the discoloration producing components, namely, the decomposition product resulting from the decomposition of the diazo compound contained in the sensitive layer of the copying paper, after exposure under the transparent drawing of which a positive print is desired and the excess of

(Deposition of Dr. Josef Loevenich.)

azo dyestuff coupling component and of alkali not used up in the development, present in the white background, in that it prevents the oxidizing action of the oxidizing substances present in the atmosphere in the space in which the prints are stored?

Answers to X 11 and X 12—

No, Thiourea as such is not a reducing agent, therefore cannot have a reducing action. If Thiourea would prevent the oxidizing action of the oxygen of the air on the Phenols by absorbing itself the oxygen, an aqueous solution of Thiourea should be decomposed by aerial oxygen on long exposure to air. However, Thiourea itself as well as its aqueous solution are so completely stable against air that air can be passed through such a solution without oxidizing the Thiourea.

X 13. If the thiocarbamide in the white background of the positive diazo type print made by the process set forth in question X 10 were merely chemically non-reactive with respect to the oxidizing substances present in the atmosphere, that is, did [307] not and could not remove and take up or absorb the oxidizing substances from the atmosphere surrounding the print in the space in which the print is stored, would not the components producing the discoloration, namely, the decomposition product resulting from the decomposition of the diazo component contained in the sensitive layer of the copying paper after exposure under the transparent drawing of which a positive print is desired, and the excess of azo dye-

(Deposition of Dr. Josef Loevenich.)

stuff coupling component and of alkali not used up in the development, also present in the background, be converted by the action of the oxidizing substances contained in the atmosphere surrounding the print into the objectionable discoloration compound in spite of the presence of the thiocarbamide?

Answer. If it were a fact that Thiourea takes up oxygen from the atmosphere and hereby becomes oxidized itself, it would be necessary that in spite of the presence of Thiourea on the paper, the latter would discolor as soon as the Thiourea has been used up by the aerial oxygen. From there on the same condition would prevail on the paper as if no Thiourea were present. Since, however, it was proved that Thiourea does not absorb any oxygen from the atmosphere, entirely different reactions must take place on the paper in the presence of Thiourea. These have nothing to do with the absorption of oxygen from the air by Thiourea, or with the reducing action of Thiourea. According to my opinion, the discoloration of the background of the paper is prevented by the presence of Thiourea by the reaction expounded in the answer to Question 19, and furthermore, in answer to item 8 of the cross-interrogatory to Question 8, and in answer to item 3 of the cross-interrogatory to Question 17.

X 14. Is it not true that this oxidizing influence of the atmosphere surrounding the print in the

(Deposition of Dr. Josef Loevenich.)

space in which it is stored upon the components producing the discoloration present in the white background of the positive diazo type print can be arrested only if a substance is present, or associated with said components, which is chemically reactive with respect to the oxidizing elements present in such atmosphere, that is, can and does remove and take up or absorb the oxygen from the surrounding atmosphere?

Answer. To this point the same answer applies as to item 13.

X 15. Is it not a fact that a substance which is chemically reactive with respect to the oxidizing substances of the atmosphere, that is, can and does remove and take up or absorb the oxidizing substances from the atmosphere which surrounds it, is a reducing agent? [308]

Answer. Yes.

X 16. Referring to the statement quoted in interrogatory No. 9 from United States Letters Patent No. 1,821,281, is it not true that such statement has to do only with the action of a reducing agent as an accessory material in the diazo type print itself, namely, for preventing the discoloration of the white background of the finished positive diazo type print?

Answer. Yes.

X 17. If your answer to interrogatory No. 19 is "IT DOES NOT", is such answer merely your opinion, or is it based upon actual tests, and if

(Deposition of Dr. Josef Loevenich.)

based on actual tests, describe in detail the tests made and the results obtained.

Answer. ———

X 18. If the presence of thiocarbamide in the white background of the positive diazo type print, made by the process as set out in question X 10, prevents the action of the oxidizing substances of the atmosphere upon the discoloration producing components also present in the background, does this not also indicate that thiocarbamide has the additional property of arresting under normal conditions of storage or keeping this discoloration of the background of said print?

Answer. Yes.

X 19. Is it not a fact that the term "anti-oxidant" and the term "reducing", as applied to a particular chemical compound, are synonymous and hence mean one and the same thing?

Answer. Merely on outward comparison, the difference between a reducing agent and an anti-oxidant is evident from the quantities used of the one or the other substance. Aquimolecular quantities have to be applied with a reducing agent in order to bring about a complete reducing action, while an anti-oxidant, contrary to this, acts even in minute quantities.

Interrogatory No. 21. Will you please define the substance or substances known as thiosulphates?

Answer. Thiosulphates are derivatives of the hypothetical Thiosulphuric Acid. The best known

(Deposition of Dr. Josef Loevenich.)

Thiosulphate is Sodium Thiosulphate of the Formula. $\text{Na}_2\text{S}_2\text{O}_3$ [309]

There are also known salts of the Polythionic acids, such as Dithionic Acid, Trithionic Acid, Tetrathionic Acid and Pentathionic Acid, but which are, up to date, without scientific and practical value.

Interrogatory No. 22.—How many thiosulphates are known to chemists?

Answer. No, the best known is Sodium Thiosulphate, known to the Trade as “Fixing Salts”.

Interrogatory No. 23. Are any of the thiosulphates aldehydes?

Answer. No.

Interrogatory No. 24. Are any of the thiosulphates amino compounds?

Answer. No.

Interrogatory No. 25. Are any of the thiosulphates aliphatic amido-compounds?

Answer No.

Interrogatory No. 26. Are any of the thiosulphates poly-oxy-compounds?

Answer. No.

Interrogatory No. 27. Are any of the thiosulphates organic reducing agents?

Answer. No.

Interrogatory No. 28. Are any of the thiosulphates inorganic reducing agents in the general chemical sense?

Answer. Yes.

Cross-Interrogatories to Interrogatory No. 28

X 1. Is it not a fact that the term “thiosulfate” means a salt of thiosulfuric acid?

(Deposition of Dr. Josef Loevenich.)

X 2. Is it not a fact that sodium thiosulfate of the formula [310] $\text{Na}_2\text{S}_2\text{O}_3$ is a species salt falling under the term "salt of thiosulfuric acid"?

Answer. Yes.

X 3. Is it not a fact that sodium thiosulfate of the formula $\text{Na}_2\text{S}_2\text{O}_3$ is an inorganic salt of thiosulfuric acid?

Answer. Yes.

X 4. Is it not a fact that a substance which can change the metal of a metal salt from the higher to the lower valence, as for example the ferric iron of a valence of three (3) to the ferrous iron of a valence of two (2), is a reducing agent?

Answer. Yes.

X 5. Is it not a fact that ferric chloride of the formula FeCl_3 produces in a solution of sodium thiosulfate of the formula $\text{Na}_2\text{S}_2\text{O}_3$ at first a dark violet coloration which disappears after some time, leaving a colorless solution containing ferrous chloride of the formula FeCl_2 ?

Answer. Yes.

X 6. Is it not a fact that the reaction set forth in question X 5 shows that thiosulfate is a reducing agent?

Answer. Yes.

X 7. It is well known to chemists generally that thiosulfate is a reducing agent. Is that correct?

Answer. Yes.

X 8. The term "hyposulphite" is commonly used to designate a salt of thiosulfuric acid. Is that correct?

(Deposition of Dr. Josef Loevenich.)

Answer. Yes.

X 9. Is it not a fact that the term "thiosulfate" and the term "hyposulphite" are used interchangeably, and hence mean one and the same compound, namely, a salt of thiosulfuric acid?

Answer. Yes. [311]

Interrogatory No. 29. Do any of the thiosulphates have a reducing action when employed either in a diazo light-sensitive layer, in a developer therefor, or in the finished prints?

Answer. Yes, but in the light sensitive diazo layer it cannot be used. (Reasons for this seen in answer to Question #31.)

Interrogatory No. 30. Do any of the thiosulphates, when introduced into diazo type prints either by addition to the sensitive layer, the developer therefor, or after development, act to arrest or minimize the discoloration of the background of such prints?

Answer. Yes, when it is added to the developer, or when it is applied to the print after the developing.

Interrogatory No. 31. What is the action of thiosulphates, in general, when added to diazo layers or developers therefor in connection with the manufacture of diazo types?

Answer. In regard to this question, it is to be remarked that Thiosulphate cannot be added at all to solutions of diazo compounds. It forms a diazo sulphonate with the diazo compound acid solution,

(Deposition of Dr. Josef Loevenich.)

which it precipitates from the diazo solution as a difficultly soluble salt. Diazo sulphonates are, strictly speaking, not diazo compounds because they do not form dyestuffs with alkaline solutions of azo-components, such as are used as developers for diazo type papers. When Thiosulphate is applied on the paper together with a developer the acid reaction of the paper causes a liberation of Sulphur Dioxide (SO_2) and of molecular sulphur which both reduce the Phenols formed and thus prevent a discoloration of the paper.

Interrogatory No. 32. Do any of the thiosulphates act as anti-oxidants when employed in diazo type processes; that is, when applied to the diazo sensitive layer, or the developer therefor, or even after the development of the diazo type prints?

Answer. Thiosulphates do not act as anti-oxydants because in the action of anti-oxydants minute quantities must suffice to prevent discoloration of the paper. As shown by practical tests, much larger quantities of Thiosulphate are required. Minute quantities of Thiosulphate are completely inactive on paper and do not in any way prevent discoloration. [312]

Cross-Interrogatories to

Interrogatories Nos. 29, 30, 31 and 32.

X 1. The white background of positive diazo type prints which are produced by the process in which the exposed print, after treatment with the

(Deposition of Dr. Josef Loevenich.)

developer, is immediately allowed to dry or is dried without previous or subsequent washing at all, does discolor after a short period of time under normal conditions of keeping or storage because the causes which result in the discoloration, namely, the decomposition product resulting from the decomposition of the diazo compound contained in the sensitive layer of the copying paper after exposure under the transparent drawing or picture of which a positive print is desired, and the excess of azo dyestuff coupling component and of alkali not used up in the development, have not been removed. Is that correct?

Answer. Yes.

X 2. Is it not a fact that this discoloration of the white background of positive diazo type prints exists only with positive diazo type prints which have been made by a process in which the exposed print, after treatment with the developer, is immediately allowed to dry or is dried without previous or subsequent washing at all, and that such discoloration takes place only after and during storage of such diazo type prints for record purposes?

Answer. No. Even when the prints are washed, the background of the prints still discolors. Discoloration takes place in storage.

X 3. Is it not a fact that the normal conditions under which positive diazo type prints are stored,

(Deposition of Dr. Josef Loevenich.)

or kept, include atmospheric influences such as air, light, etc.?

Answer. Yes.

X 4. Is it not a fact that this discoloration of the white background of positive diazo type prints obtained by a process in which the exposed print, after treatment with the developer, is immediately allowed to dry or is dried without previous or subsequent washing at all, is due to the chemical influence of air and light, during normal conditions of storage or keeping, upon the components, namely, the decomposition product resulting from the decomposition of the diazo compound contained in the sensitive layer of the copying paper after [313] exposure under the transparent drawing of which a positive print is desired, and any excess of azo dyestuff coupling component and of alkali not used up in the development, present in the background of the positive diazo type prints?

Answer. Yes.

X 5. If a positive diazo type print is made by the process in which the exposed print, after treatment with the developer, is immediately allowed to dry or is dried without previous or subsequent washing at all, and thiosulfate like sodium thiosulfate is introduced into such print at some stage of said process, as for example by adding same to the sensitive layer, or during or after development, as stated in the quoted paragraph from United States Letters Patent No. 1,821,281 in interrogatory No. 9,

(Deposition of Dr. Josef Loevenich.)

does or does not the white background of such print discolor when stored for extended periods under normal conditions of keeping, as by placing the print in a desk drawer, in a filing cabinet, or the like?

Answer. The white background of the finished print discolours less when Sodium Thiosulphate is present. Sodium Thiosulphate, however, cannot be added to the light sensitive diazo layer, because in the light sensitive acid solution it is easily decomposed, and the diazo compound is converted into a product which is not any more capable of coupling.

X 6. If your answer to question X 5 is "IT DOES NOT", is such answer merely your opinion, or is it based upon actual tests, and if based on actual tests, describe in detail the tests made and the results obtained.

Answer. My answer to Question #5 is founded on tests.

X 7. Assuming that the background of the positive diazo type print made by the process set out in question X 5 does not discolor or discolor to any noticeable extent, when stored for an extended period under normal conditions of keeping, does that not indicate that thiosulfate exerts a reducing action upon the discoloration producing components, namely, the decomposition product resulting from the decomposition of the diazo compound contained in the sensitive layer of the copying paper

after exposure under the transparent drawing of which a positive print is desired, and the excess of azo dyestuff coupling component and of alkali not used up in the development, present in the white background, in that it prevents the oxidizing action of the oxidizing substances present in the atmosphere in the space in which the prints are stored?

[314]

Answer. It is a fact that Sodium Thiosulphate acts here as a reducing agent and absorbs oxygen from the atmosphere. The proof that Thiosulphate acts as a reducing agent is given by the fact that an aqueous solution of Thiosulphate is decomposed on standing, by taking up oxygen from the air, whereby Sulphur is precipitated. Contrary to this, the aqueous solution of Thiourea is stable against air and therefore cannot absorb any aerial oxygen, hence cannot act as a reducing agent on the paper.

X 8. If the thiosulfate in the white background of the positive diazo type print made by the process set forth in question X 5 were merely chemically non-reactive with respect to the oxidizing substances present in the atmosphere, that is, did not and could not remove and take up or absorb the oxidizing substances from the atmosphere surrounding the print in the space in which the print is stored, would not the components producing the discoloration, namely, the decomposition product resulting from the decomposition of the diazo component contained in the sensitive layer of the copying paper after exposure under the transparent

(Deposition of Dr. Josef Loevenich.)

drawing of which a positive print is desired, and the excess of azo dyestuff coupling component and of alkali not used up in the development, also present in the background, be converted by the action of the oxidizing substances contained in the atmosphere surrounding the print into the objectionable discoloration compound in spite of the presence of the thiosulfate?

Answer. Yes.

X 9. Is it not true that this oxidizing influence of the atmosphere surrounding the print in the space in which it is stored upon the components producing the discoloration present in the white background of the positive diazo type print can be arrested only if a substance is present, or associated with said components, which is chemically reactive with respect to the oxidizing elements present in such atmosphere, that is, can and does remove and take up or absorb the oxygen from the surrounding atmosphere?

Answer. No, because Thiourea does not absorb oxygen from the atmosphere; however, in spite of this arrests the discoloration of the background of the print.

X 10. Is it not a fact that a substance which is chemically reactive with respect to the oxidizing substances of the atmosphere, that is, can and does remove and take up or absorb the oxidizing substances from the atmosphere which surrounds it, is a reducing agent? [315]

Answer. Yes.

(Deposition of Dr. Josef Loevenich.)

X 11. If your answer to interrogatory No. 30 is "IT DOES NOT", is such answer merely your opinion, or is it based upon actual tests, and if based on actual tests, describe in detail the tests made and the results obtained.

Answer.

X 12. If the presence of thiosulfate in the white background of the positive diazo type print made by the process as set out in question X 5, prevents the action of the oxidizing substances of the atmosphere upon the discoloration producing components also present in the background, does this not also indicate that thiosulfate has the additional property of arresting under normal conditions of storage or keeping, this discoloration of the background of said print?

Answer. Yes.

X 13. Is not the invention, as described in the quoted paragraph from United States Letters Patent No. 1,821,281 in interrogatory No. 9, the production of positive diazo type prints which have a white background that will stay white for extended periods of storage or keeping, and hence stable against discoloration?

Answer. Yes; but only when using a reducing agent. However, it is not mentioned at any place that a stable white background can also be obtained by other ingredients which are not reducing agents.

X 14. The production of positive diazo type

(Deposition of Dr. Josef Loevenich.)

prints which have a white background that will stay or remain white for extended periods of storage or keeping, is made possible according to the invention as described in the quoted paragraph in interrogatory No. 9 by the presence of a reducing agent in the background of said prints. Is that correct?

Answer. Not only reducing agents are in question for the prevention of the discoloration of the background, but also other ingredients, such as Thiourea.

X 15. Is it not a fact that in the invention, as described in the quoted paragraph in interrogatory No. 9, the reducing agent exerts its reducing action only in connection with the white background of the finished diazo type print?

Answer. Yes. [316]

X 16. Is it not a fact that in the invention, as described in the quoted paragraph in interrogatory No. 9, the reducing agent exercises its additional property, namely, arresting the discoloration of the background, only after the positive diazo type prints have been made and are stored or kept for record purposes?

Answer. Yes.

X 17. Does the statement quoted in interrogatory No. 9 inferentially or directly describe that the reducing agent, if added to the sensitive layer, exerts its reducing action upon the components of such

(Deposition of Dr. Josef Loevenich.)

layer, and if so, explain in detail where this is found in said quoted statement.

Answer. Yes. In the abstract it is mentioned that the reducing agent exerts its reducing action when added to the light sensitive layer. It is said in the abstract:

“The invention is based on the observation that the discoloration of the background in all kinds of diazotype processes can be prevented * * * if a reducing agent is added to the sensitive layer.”

X 18. Does the statement quoted in interrogatory No. 9 inferentially or directly describe that the reducing agent, if added to the developer, exerts its reducing action upon the components of such developer, and if so, explain in detail where this is found in said quoted statement.

Answer. Yes. In the abstract it is mentioned that the reducing agent exerts its reducing action when it is added during the development of the print. It says, literally,—

“The invention is based on the observation that the discoloration of the background in all kinds of diazotype processes can be prevented * * * if a reducing agent is added * * * during * * * development of the picture.”

(Signed) DR. LOEVENICH. [317]

TESTIMONY OF LEE R. DUNCAN FOR
DEFENDANT.

Lee R. Duncan, called as a witness on behalf of defendant, being duly sworn testified as follows:

Direct Examination

My name is Lee R. Duncan. I reside at Fresno, California. I am a consulting engineer for The San Joaquin Light & Power Corporation, being employed in such capacity for 17 years. I hold a state license as a civil and structural engineer. In the course of my duties with this company, I have had to do with the making of so-called diazo types or direcprints.

The manufacture of direcprints is briefly a process for making a positive print directly from an original. There are several types of paper available on the market which we have used; some of them make a print having a bluish black line and some make a print having a dark Van Dyke brown line. They all are quite similar in the method of developing and finishing. These prints are used in our work in the same way that any other print made by any other process like brown line or blue prints are used.

I am familiar with the paper and developer sold by plaintiffs, Charles Bruning Company and the paper and developer sold by defendant, Dieterich-Post Company, and have used both. My familiarity is with the results obtained from the paper rather than with the chemical composition thereof as I know nothing of the chemistry involved. My com-

(Testimony of Lee R. Duncan.)

pany has been making directprints from this particular diazo paper for approximately 2 years. Prior to that time my company has used every process available for reproducing images from tracings.

I have used the so-called Brown-Line process in which a paper having a silver nitrate coating is employed. This paper [318] when exposed to sunlight the exposed area is darkened and therefore in order to get a print having a black line or a dark line on a white ground, it is necessary to first prepare a negative from the original and then make the positive print from the negative, using it to shut out the light except for the lines to be printed. The same machine is used in manufacturing the prints from the Brown-Line process and from the diazo or directprint process, and both processes are practiced in our own establishment.

Being asked if any chemicals are used in the Brown-Line process for arresting the discoloration or fixing of the background; yes, that type print takes what is commonly known as the hypo bath—the sodium hyposulfite bath.

The COURT: “Q. For what purpose?

“A. As we understand it, it is for fixing the print so that no further discoloration will occur upon exposure to light.

I recall having a luncheon at Fresno about a month ago with Messrs. Post and White, particularly that portion of the conversation relating to the use of hypo in arresting the discoloration of the

(Testimony of Lee R. Duncan.)

background of Van Dyke (Brown-Line) prints. In the Van Dyke prints we always used that. I was asked if I had ever used it in connection with the diazo prints, and I stated that if I had been making the prints myself I would have used it, just because I am that type, I experiment a great deal; I used to make my own blueprint paper and have made papers for myself. I was not certain that my men in the blueprint department used it at that time.

Being asked whether he had an opportunity to check whether his men had used hypo, yes, I recall that early in the spring, pressure was brought to bear on us to find out which of the several papers offered were the most suitable. I requested my blueprint man to secure several rolls of each of the different [319] types of paper available and make a series of tests on those to see if there was any real preference as to which of the papers we would buy. These tests were made in this way. A series of tracings were taken, and prints were made thereof by different methods and developed and fixed by different methods in an effort to discover whether one of the paper had qualities that were more desirable than another and whether we would show any preference as a matter of policy in the purchase of the papers.

Being handed a print and asked to identify it, yes, that is the print made as a part of this test. It was made on March 14th of this year. It was

(Testimony of Lee R. Duncan.)

made on Lietz, 10 by 12 Tiogo, using their 12-12 developer. This print was washed in hypo after making and then later exposed to the sunlight with half of it covered up so that the sun could not strike half of it. I wanted to find out what measure of discoloration would occur after the prints were exposed to the sun. That is important. The lower half of the print, the face of the print, is marked "Exposed to the sun".

Mr. WHITE: I would like to offer in evidence the print which the witness has just identified and have it marked Defendant's Exhibit next in order.

(The print was marked "Defendant's Exhibit F.")

The COURT: Do you mean the white portion is the portion that was exposed to the sun?

"A. That is correct.

The COURT: According to that exhibit it turned white.

Mr. WHITE: Brown when it was first developed, and it turned white later. It was discolored, however.

Being handed a print and asked to identify it; This was made on April 10, 1934 on Post No. 500. It was made from a pencil tracing on tracing paper. This was also exposed to [320] the sun in a similar manner but, unlike the other, it turned dark upon exposure to the sun.

(Testimony of Lee R. Duncan.)

Mr. WHITE: I offer in evidence the Post No. 500 print which the witness has just identified and ask that it be marked Defendant's Exhibit next in order.

(The print was marked "Defendant's Exhibit G.")

Being handed a print and asked to identify it, this was made February 9, 1934 from Dietzgen direct paper and half of it exposed to the sun. It changed color. It would be difficult to say whether it was darker or lighter, it turned to a yellowish color.

Mr. WHITE: I offer this in evidence as Defendant's Exhibit next in order.

(The print was marked "Defendant's Exhibit H.")

Being handed a print and asked to identify it, this was made March 14, 1934, on Post No. 500 paper and was developed with Post developer and was afterwards washed in hypo. The portion of the print exposed to the sun changed color.

Mr. WHITE: I offer in evidence the print which the witness has just identified and ask that it be marked Defendant's Exhibit next in order.

(The print was marked "Defendant's Exhibit I.")

With reference to Exhibit G, the one made from the pencil tracing, this was developed in the regular way, namely, subjected to the developer with no subsequent treatment. Exhibit I, however, was de-

(Testimony of Lee R. Duncan.)

liberately washed in hypo after development, and this fact is noted on the back thereof.

Being handed two prints and asked to identify them, after we had our conversation in regard to the permanency of these prints, I was curious to know precisely what would be the result with the use of this Charles Bruning paper.

Mr. HOFFMAN: I object, your Honor. This line of questions [321] is directed to show that by this ex parte test the inventions in the two patents in suit are inoperative. I will object at this time, but I will reserve my remarks concerning this until the final summation.

The COURT: Objection overruled; exception.

Being asked if the paper and developer used in making these two prints was in fact the paper and developer of the Bruning Company, yes, this was purchased directly from the Bruning Company after we had our meeting in Fresno. The reason for this was that on these earlier tests I discovered that when we ordered Bruning paper, the Lietz Company supplied the paper but we were not at all certain that it was Bruning paper although Lietz had told us it was. Being handed a letter and asked to identify it, this is the answer to a request I made of the Lietz Company that they state positively whether the paper I had formerly purchased from them was Bruning paper or not. It says "confirming our conversation to-day, our direct blackline paper is made by Charles Bruning Company", and is signed by Mr. Crocker.

(Testimony of Lee R. Duncan.)

Mr. WHITE: I offer in evidence the letter from the A. Lietz Company, which the witness has just identified, and ask that it be marked Defendant's Exhibit next in order.

(The letter was marked "Defendant's Exhibit J.")

I still felt a little hesitant as far as my personal knowledge was concerned. I did not wish to trust the statement that Mr. Crocker of the Lietz Company had made to me, and we secured, in fact several rolls of this Bruning paper. I made two prints from the same tracing, the one I marked "office copy" and kept it on my desk for use on the desk, and the other I took out to a job which happened to be a construction job involving a small cottage. This print on the job was nailed up on an easel and left there for several days while [322] the print marked "office copy" remained in the office until I brought it down here last night. These prints were identical in quality when they were first made, that is, the background of the prints. The print I have in my hand was kept in my office, and the print sitting on the bench is the one that was placed on an easel at the job.

The COURT: The one you have in your hand is white?

"A. They were both made at the same time.

The print used on the job showed considerable discoloration of the background.

Mr. WHITE: I wish to offer in evidence the two prints which the witness has just identified, the

(Testimony of Lee R. Duncan.)

one marked "Office copy" as Defendant's Exhibit next in order.

(The print was marked "Defendant's Exhibit K.")

I also offer the second print which the witness has just identified as Defendant's Exhibit next in order.

(The print was marked "Defendant's Exhibit L.")

I have not, to my knowledge, ever made a direct print having a background which did not discolor. I have found little or no difference between the prints made from the paper and developer of plaintiffs or of defendants or of anyone else. The men in my blueprint and directprint shop use hypo in washing the directprints.

Cross Examination .

"Q. Now, Mr. Duncan, you have testified that the Brown-Line process is similar to the diazo type process have you not?

"A. I testified that the same machinery or equipment was used.

In the making of a diazo type or Brown-Line print, it is the paper and developer that are the essential elements although there is certain apparatus commonly used in making the prints. Being asked whether, as a matter of fact, the chemical [323] composition of the paper and developer, that is, the chemical compounds that are contained in the sensitive layer of the paper and those that are contained in the developer, are the things that determine the character of the print, I am not a chemist

(Testimony of Lee R. Duncan.)

but I assume that to be correct because different papers require different types of chemicals.

Being asked what machinery can be used for both, the same; and by "the same" I mean that the same printing frame in which you would make one of the prints could be used to make the other and the same developing equipment could be used.

Being asked whether in the making of a Sepia or Brown-Line print you start with a sensitized paper having a coating containing both a ferric and a silver salt, I know in a fashion but would not undertake to make any statement about the type of salts. If it were desired to make a Brown-Line print we would select the sensitized paper for making such Brown-Line print. On the top of this selected paper we would place a transparent tracing of which a print is desired, and then expose the paper through the transparent tracing to light. After exposure, the transparent tracing would be removed from the exposed print, and the first thing we would do with the exposed print would be to wash it with water.

"Q. Do you know the reason for washing that with water at that point?

"A. To wash off the unexposed parts of the print and also wash the exposed part of the print.

"Q. Then after you have done that washing operation the next operation is to wash it off with what you call hypo or thiosulfate?

"A. Sodium thiosulfate.

"Q. That is the next operation, is it not? Of course, you are not a chemist, are you? [324]

(Testimony of Lee R. Duncan.)

“A. No, I do not claim to be a chemist.

“Q. Then, of course, you would not know the reason why these two steps follow in sequence, first washing with water, and then washing with thiosulfate.

“A. The thiosulfate fixes the chemicals remaining in the paper so that light will not have any effect on it.

“Q. You just testified that you are not a chemist, and so you do not know what the reason for it is. You don't know why those two steps in sequence follow, first washing in water, and then followed with hypo?

“A. I do not have to be a chemist to know what the reason is for that.

“Q. There is a very definite reason. The washing step is to take off the unexposed part of the compounds that are soluble in water first, and the thiosulfate washing is to take off the insoluble compound which was formed at the exposure, so that when you wash with thiosulfate the thiosulfate reacts with the silver and dissolves that off the print——

Mr. WHITE: I object to that as not the testimony of the witness, but as the testimony of counsel.

The COURT: Overruled; an exception.

“Q. And then the third step, after you have washed with thiosulfate, you then wash again with water, do you not?

“A. Yes, it is customary to wash with water.

(Testimony of Lee R. Duncan.)

“Q. Then really in the Brown-Line process you have three distinct steps, in the first place you wash the print with water, then you wash it with thio-sulfate, and then you finally wash it again with water.

“A. That is true.

“Q. Isn't that correct?

“A. Yes.

“Q. And you get the finished print? [325]

“A. Yes.

I am familiar with the positive diazo process, the process of the patents in suit. I have purchased some of the paper and of the developer of the Bruning Company, and have made prints with such and developer. I made one of the prints by exposing the paper to light with a tracing over it, then removed the tracing from it and placed the print on a board, and developed the print by applying the developer solution that was furnished with the paper. The developed print I washed first with water and next with hypo, and then dried it. Being asked whether the instructions that came with the Bruning Company paper and developer state that the developed print should be washed and then treated with hypo, they did not but we did not get satisfactory results by doing it according to their instructions. The instructions say to apply the developer to the sensitized surface of the print and the print is finished.

Being handed Defendant's Exhibit K, this is the exhibit I made from the Bruning Company paper

(Testimony of Lee R. Duncan.)

and developer. It was made by first exposing the paper under a tracing to obtain an exposed print, applying the developer to the exposed print, then washing the print, and then drying it.

“Q. Do the directions of the Bruning Company that come with that paper and developer say anything about washing the print after development?

“A. No, they do not.

The COURT: Now show him the other one.

“Q. I now hand you Defendant’s Exhibit L. I understand that you——

The COURT: “Q. Was that made in the same way?

“A. Identically the same way.

“Q. You washed the print after development, did you?

“A. Yes. [326]

“Q. And then dried it?

“A. Yes.

With reference to the Brown-Line print I made, I washed the print after exposure, then applied the hypo or sodium thiosulfate thereto, and then washed it.

“Q. Then you end up with a print that no longer has any hypo in it, is that not correct?

“A. Provided you wash all the hypo out it is correct.

“Q. In ordinary washing operations, as you usually do it in practice, you aim to wash the print as thoroughly as possible, do you not?

“A. I aim to.

(Testimony of Lee R. Duncan.)

“Q. And if you washed it thoroughly you would have very little, if any, thiosulfate in the finished print?

“A. I presume that that is true.

Redirect Examination

Mr. WHITE: If the Court please, may I introduce another exhibit?

The COURT: Yes, certainly.

Being handed a print and asked to identify it, this is an exposure on Lietz No. 12-10 dark paper, using Lietz developer No. 12-12. It was not washed. No hypo was used. It was made on March 14 of this year. A portion of it was exposed to the sun.

The COURT: And there was a change of color after exposure?

“A. A very definite change.

Mr. WHITE: I offer this print in evidence as Defendant's Exhibit next in order.

(The print was marked “Defendant's Exhibit M.”)

The COURT: That was someone's process, either the plaintiffs' or the defendant's process, was it?

[327]

Mr. WHITE: The witness has previously testified that the Lietz Company furnished him with Bruning paper and Bruning developer.

“Q. That is true as to this exhibit, is it not, Mr. Duncan?

“A. Yes.

With reference to Defendant's Exhibits K and L, I washed these prints with water after they were

(Testimony of Lee R. Duncan.)

developed in order to get prints with as white a background as possible. They are more desirable than any other background. We found by experiments we got better results, whiter background, by washing the prints than not washing them and so we washed them. Exhibit L was placed on the job Wednesday afternoon and was taken away late Friday afternoon of the same week. It was intermittently exposed to sunlight. It was deliberately placed in the living room of the cottage before an open unfilled window. Later in the afternoon the men were instructed to move it to another window so that it had sunlight intermittently throughout its use because that is the ordinary use that a print is put to on the job.

The COURT: Did you make any tests at all of the plaintiffs' process following these directions?

"A. Yes, indeed. We tried all of them according to directions.

The COURT: What was the result when you followed the directions and did not wash?

"A. The results when we followed the directions were that we got prints with slightly clouded background, sometimes approaching a mild India pink or light wine color or bluish cast; when we washed them in water we got a lighter colored print, washing all that material off.

The COURT: Did you expose any of these prints made according to directions?

"A. Yes, this last exhibit, the one that was just last [328] offered. The instructions to my men were to test the papers out thoroughly. I supervised the tests myself.

(Testimony of Lee R. Duncan.)

The COURT: And they were made according to directions?

“A. Yes. We placed prints in a hypo bath as a matter of experiment to find out what would happen.

The COURT: And you made tests of the different process?

“A. Yes.

The COURT: And you got a discoloration there, too?

“A. On all of them.

The COURT: In a shorter time on defendant's than on plaintiffs'?

“A. We really could see no difference, no substantial difference.

Recross Examination

In connection with defendant's Exhibits K and L I washed them after I had applied the developer. Being asked whether this washing did not remove all of the materials that were left in the print as a result of the exposure to light of the sensitized paper and the application of the developer to the exposed print, I do not know anything about that, as everything that I wanted was still on the print.

The invention in diazo types—the Bruning paper and developer—is by having a reducing agent in the background, the print does not discolor, but you do not have to wash it. When you washed that print you took everything off the paper. Nevertheless the prints discolored just as badly without washing as when we washed them.

I made part of these tests, and part of them were made under my supervision. I can not do every-

(Testimony of Lee R. Duncan.)

thing alone. I went into the blueprint room in the morning and wrote down specifically what was to be done after the papers had arrived. [329] I explained to the boys so there could be no misunderstanding. I instructed what was to be done; the procedure was to be written on the back, and when the prints were finished they were to be turned over to me for examination.

The COURT: Mr. Hoffman, your reducing agent may be applied in three different ways?

Q. That is correct, your Honor.

The COURT: Is it your claim that the reducing agent is in the paper and in the developer?

Mr. HOFFMAN: Or you can do it afterwards.

The COURT. I know you can do it afterwards. Here it does not appear that the reducing agent was applied after the print was made. What I want to know is whether the reducing agent was found in your paper and in your developer.

Mr. HOFFMAN: If I get your Honor's question correctly, you would like to know whether the commercial product of plaintiff contains a reducing agent in both the paper and in the developer?

The COURT: Or in either.

Mr. HOFFMAN: Or in either. Yes, they do.

The COURT: Then the test is more or less important.

Mr. HOFFMAN: That is right, your Honor.

TESTIMONY OF RUDOLPH C. POST
FOR DEFENDANT

Rudolph C. Post, called as a witness on behalf of defendant, being duly sworn testified as follows:

Direct Examination

My name is Rudolph C. Post. I am 47 years of age, and reside in Walnut Creek, California. I am President of the Dieterich-Post Company, the defendant here in suit. I have been engaged in the business of this company since 1902 or 1903, and for about 12 to 13 years as its President.

Being handed a letter and asked to identify and read it, this is a letter from Renker-Belipa, Duren RL., addressed to the Dieterich-Post Company at our address in San Francisco:

“We beg to acknowledge receipt of your letter of the 25th ult.”—under date of the 13th of February they answered, and we wrote on the 25th of January. It says:

“We beg to acknowledge receipt of your letter of the 25th ult. and want to reply as follows:

“The name of Dr. Loevenich has not been mentioned before. Your presumption that he has won the case for Messrs. Kalle & Co. is quite wrong, because Dr. L. has nothing to do with Kalle. It will become thus quite clear, that the scientists do fully agree each other with regards to the effects of the Thio Urea, a fact of greatest importance, because they have found it by working quite independently.

“To your further question we want to say, that we are coating our paper under a permit of Kalle,

(Testimony of Rudolph C. Post.)

because we have used already the relative chemicals before Kalle. Kalle have also confirmed that we might use this chemical for our deliveries in this country and to abroad, and you will understand thus that we do not infringe any of Kalle's patents."

[331]

"We hope that these informations will have given you some further help, and we are looking forward to your relative news.

"Yours truly."

We receive our direcprint paper and developer therefor from the Renker-Belipa Company in Germany, the people who wrote that letter.

Mr. WHITE: I wish to offer in evidence the letter just identified by the witness as Defendant's Exhibit next in order.

(The letter was marked "Defendant's Exhibit N.")

Our Company does not manufacture either a diazo sensitive layer paper or the developer for use in connection with such paper, but import all of it.

Being handed a copy of the "International Blue Printer" of August, 1934 and asked to read the advertisement of the Bruning Company on page 1, shall I read all of it?

The COURT: Why don't you read it?

Mr. WHITE: This advertisement reads as follows:

"From man to man * * * from company to company * * * the good news about Bruning Black

(Testimony of Rudolph C. Post.)

and White Prints is spreading all over the country.

“Engineers, chief draftsmen and production men like the way these easy-to-read positive prints save time in checking * * * prevent mistakes by allowing pen, pencil or crayon notations to show up clearly on the white background. Today, BW prints are being used for everything from preliminary plans to window displays—and new uses are being developed continually.”

“Q. Mr. Post, from your experience in the industry—I would like to have the record show that that advertisement appeared in the *International Blue Printer* of August, 1934, Volume 7, No. 8.

The COURT: What is the significance of that last?

Mr. WHITE: The significance of it is merely to show the [332] general use to which the Bruning Company, itself, advertised these prints might be put. It is being used for everything from preliminary plans to window displays; in other words, it is not used merely to keep in their desks and refer to from time to time. They are used the same as blueprints.

The COURT: That is what they are claiming in court, is it not?

Mr. WHITE: The testimony of Mr. Klein was to the effect that the normal condition of use of Bruning prints is in storage in the desk or in the office.

(Testimony of Rudolph C. Post.)

The COURT: Don't they claim they are not subject to discoloration on exposure to light?

Mr. WHITE: That is, they claim that the reducing agent arrests discoloration under normal conditions.

The COURT: They do not mention that in the advertising?

Mr. WHITE: They do not mention that in the advertising. The advertising merely states that the prints may be used in general for everything from preliminary plans to window displays, in which they are exposed to light rather than kept in the office files.

The COURT: The reason I asked was, they do not make any difference in the advertisement than they do here in court.

Mr. WHITE: I gathered from the testimony of Mr. Klein that their claim is that the normal conditions referred is the normal condition of storage in office files.

The COURT: Is that your position, Mr. Hoffman?

Mr. HOFFMAN: No, that is not the testimony, at all. The testimony is that in normal conditions of storage you might have them around your desk or you might have them in your office drawer or filing cabinet, and you may have them exposed to sunlight wherever they are ordinarily used.

The COURT: And by reason of your reducing agent the discoloration of the background is reduced? [333]

(Testimony of Rudolph C. Post.)

Mr. HOFFMAN: That is correct.

Direcprints, diazo prints are used entirely in the same manner for the same purposes as blueprints with the exception that the Brown-Line prints are preferred because their backgrounds are generally more stable. Being handed a print and asked to identify it, this is a Brown-Line print that I made, that I did not wash in hypo, but washed in plain water only. It was made in our own establishment on October 1, 1934.

The COURT: According to what process?

“Q. This is the Brown-Line process.

Mr. WHITE: I offer in evidence the print to which the witness has just testified and identified and ask that it be marked defendant's exhibit next in order.

(The print was marked “Defendant's Exhibit O.”)

Being handed another print and asked to identify it, this is a print made by the Brown-Line process in which the print is first washed in water, then in hypo, and then again in water, the way these prints are regularly washed. It was made in our establishment and on the same day as the other print.

The COURT: What is the difference between these two?

“A. The print that is washed in water and then in the sodium thiosulfate retains a clearer background than the print which is not so washed. You see this has turned somewhat gray, but the print

(Testimony of Rudolph C. Post.)

that was washed in hypo remains a beautiful clear white, as you see.

The COURT: They are both of the same exposure?

“A. Those two prints were the same exposure.

Mr. WHITE: I wish to offer in evidence the print to which the witness has just testified and ask that it be marked defendant’s exhibit next in order.

(The print was marked “Defendant’s Exhibit P.”)

Being handed a further print and asked to identify it, [334]

Mr. WHITE: I will offer in evidence the print which the witness has just identified and ask that it be marked Defendant’s Exhibit next in order.

(The print was marked “Defendant’s Exhibit Q.”)

With reference to Defendant’s Exhibits O, P, and Q, the backgrounds are not the same. The background of the Brown-Line print that was not washed in hypo has not remained as clear a white as the print that was washed in hypo. The direcprint is a clearer print.

The COURT: What do you mean by a direcprint?

“A. This is a diazo type paper that we have been talking about in this suit.

The direcprint paper No. 500 is the trade name of our diazo paper. The background of defendant’s Exhibit Q has discolored but I cannot say with

(Testimony of Rudolph C. Post.)

certainly that this background was as white as the background of defendant's Exhibit P immediately after it was made.

The COURT: All of these prints to which you testified were made according to your process?

"A. Our two processes, one of the Brown-Line process and the other process.

Cross Examination

None. [335]

TESTIMONY OF LODEWIJK PIETER FRANS
VAN DER GRINTEN FOR PLAINTIFFS
(Recalled in Rebuttal).

Lodewijk Pieter Frans Van der Grinten, recalled as a witness in rebuttal, testified as follows:

Direct Examination

"Q. I hand you the Gronau patent, Defendant's Exhibit D, and ask you to state whether you ever experimented with the Gronau apparatus.

"A. Yes, I have.

"Q. Will you please describe what you found?

"A. The result of our experiments with the Gronau apparatus were that when the Gronau apparatus was used for the purpose it was designed for, that is to say, for development with volatile alkali, the development with gases, it was not perfect, but it was practically suitable. The paper to be developed was then brought quite near to the belt,

(Testimony of Frans Van der Grinten.)

which had a thin film of a solution of ammonia gas in water on it, and consequently, and quite in accordance with the description in the patent, the ammonia fumes emerging from the water solution in which they were had to pass only a very small distance to reach the layer which they had to develop, because, as said in the patent, the surface to be developed was carried along with the belt in near contact over a certain distance. However, when we tried to apply with the Gronau apparatus a liquid development to a paper which did not contain a volatile alkali, and when, consequently the process we had to perform consisted of introducing into the paper substances which were not volatile, like non-volatile alkalis, or like azodyestuff components, or like reducing agents, then we found that it was not possible at all to do this with this apparatus. Either we applied to [336] the belt a breath-thin film, like was described in the patent for the ammonia fumes process, but then the paper which was only carried in contact with the belt over a certain distance did not at all take off this developing liquid which was so thinly spread over the belt to itself so that its whole surface was developed. Consequently we tried to make the layer of developer on this belt heavier and bring more of the developing liquid on that belt, and when we did then it happened like already Doctor Lazar has described, that on the spot where the paper was introduced into contact with the belt and the big drum No. 2 in

(Testimony of Frans Van der Grinten.)

the drawing an excess of liquid was withheld, that is to say, could not enter into this box, and had to be arrested, and consequently remained there, where the belt always carried more and more of this surplus of liquid which could not enter here, and which consequently had to flow down and collect in here. This was the case particularly when this apparatus was working without prints being made in it, that is to say, when the apparatus was running empty, was running by itself——

The COURT: “Q. What was running by itself?

“A. It was running by itself without doing any work, without prints being introduced into it. The apparatuses were fitted with electric motors, your Honor, so that they could stop and start quickly. From time to time you insert a print in the apparatus. When we inserted the prints in here and they came out here it was not at all like Doctor Lazar thought—of course, he could not know it because he never experimented with the apparatus; it was so that the print was taken along with the wet drum, it was perfectly wet, and it adhered to the drum, and it adhered partly to the belt, so that consequently one part of the print, the left part, went up with the drum, and the other part went along this way; the part that went up had an enormous amount of liquid which had gathered here, an excess of [337] liquid, which had collected here on the front surface.

(Testimony of Frans Van der Grinten.)

The COURT: “Q. You mean by ‘here’ between the large drum 2 and the lower roller 3?

“A. Yes, your Honor. Your Honor will understand that it is a little difficult to explain it.

The COURT: “Q. I understand that. I just asked that for the purpose of the record so as to identify what you meant when you used the word ‘here’.

“A. That is all right, your Honor. When this print comes out here then both the belt and the drum are wet, because the drum has been all the time running with an excess of liquid. When you have paper in contact with a wet object the paper adheres to that wet object. For instance, if you made the desk, here, wet and put a sheet of paper on it the sheet of paper would adhere to the desk on account of the wetness of the desk. So this will adhere to the drum and also to the belt, because the belt is wet. So there is no reason whatsoever for this paper to go with the belt or to go with the drum. Consequently it happens that part of the print, for instance, the print comes out of the apparatus this way and this part of the print goes up with the drum and this part wants to go with the belt; on account of the slight differences in moisture this part is lifted up for a short time only, because then it proceeds in the other direction. It leaves a big amount of this liquid which is in excess here underneath this print; consequently to the surface that was developed, that is to say, to the front sur-

(Testimony of Frans Van der Grinten.)

face of the paper. These results were practically so bad that it was in practice absolutely impossible to use this apparatus for this purpose. If you will permit me I would like to repeat once more what I said in the beginning, either the apparatus was used in the way as described by Gronau and not with the ammonia fumes developer, but with a developer containing a non [338] volatile substance and only a thin film was applied, and then there was no question of obtaining a complete development, or it was used with an excess and then in practice the troubles as described before were encountered. So that the practical application of an excess was impossible.

The COURT: "Q. This is the method of applying the developer?

"A. Yes, your Honor.

The COURT: "Q. You say it was not practical. Do I understand you to say it was not practical because the paper would stick to roller No. 3, or to roller No. 2, or both?

"A. To the belt or to No. 2.

The COURT: "Q. It was not because there would be an excess?

"A. Yes, at the same time there would be an excess, too. If there were no excess it would not make so much difference.

The COURT: "Q. It runs in there, you say, for a while with no paper in there?

"A. Then you would get an excess here.

(Testimony of Frans Van der Grinten.)

The COURT: “Q. Would not that be carried off by this belt?

“A. No, your Honor, because this is lower in level than this is and, therefore the liquid would accumulate in there.

The COURT: “Q. You mean it would accumulate in the V portion?

“A. The V-formed hole which is between roller 3 and roller 2.

The COURT: “Q. Then it was not practical for two reasons?

“A. It was not practical. If we wanted to do away with this trouble, that is to say, with this excess trouble, then, of course, we would have to apply only a very thin film. We would have to work the perfectly thin film method which he suggested himself, but no complete development was obtained except in the case as Gronau, himself, says, a gas was used in the development, which gas would have to emerge from the liquid in which it was dissolved.

“Q. You heard the defendant's witnesses testify in regard [339] to Exhibits O and P. I wish you would please explain the results.

“A. It was stated that Exhibit O was made without washing with thiosulfate and that Exhibit P was made with washing with thiosulfate. The process of the Brown-Line printing is based upon the property of silver salts in connection with other chemical substances to turn brown to white. In the

(Testimony of Frans Van der Grinten.)

case of these two prints a negative original has been used and the light has passed through the white parts and caused the formation of this brown silver deposit. It is of course quite clear that the silver salt which undergoes this change by the action of light is not completely removed from such a print. Then later on such print must become brown all over, that is to say, the same reaction which caused the black spots or the dark parts to appear must of course later on in the white background in this case cause that same reaction, provided that not all the silver salts are washed out. It is a well-known fact that the silver salts do not completely dissolve in water, mostly on account of the quality of the water, itself. It is therefore practiced in this case that thiosulfate washing is done after the water washing, in order to take the last of the silver out. That is the only reason why this print Exhibit O is darker after some time when some light reaches it than Exhibit P. It is quite clear that the discoloration effect which we see here is an entirely different effect from the effect that we know in the diazo type art, and which I have already explained. These two things cannot be compared with each other. It is absolutely only by chance, I might say, that thiosulfate can be used here in this process as a solvent for silver compounds and that thiosulfate at the same time has reducing properties which make it fit for being used in the diazo type process against discoloration. [340]

(Testimony of Frans Van der Grinten.)

Cross Examination

“Q. Would it not be a relatively simple matter, Doctor, to adjust roller 3 with respect to roller 2 so that the V formation would not be as accentuated as it is in the drawing?

“A. Certainly that could be done without any great difficulty. The only thing is it is not described that way in the patent.

The COURT: “Q. It could be dropped?

“A. If this roller were dropped then we would have much less difficulty, although the back side would absolutely in the same way get the surplus which runs down here. That would not make any difference.

The COURT: “Q. But there would not be the accumulation?

“A. There would not be the accumulation and all the troubles would be less. You would have them in the same way although less. [341]

The foregoing is a correct statement of all of the evidence taken and proceedings had in said cause.

Lodged by

May 20, 1935.

WRAY N. HOFFMAN

WM. S. GRAHAM

Solicitors and Counsel for
Plaintiffs-Appellants.

ORDER SETTLING AND APPROVING
STATEMENT OF EVIDENCE.

The foregoing Statement of Evidence prepared under Equity Rule 75 is hereby settled and approved.

A. F. ST. SURE,

United States District Judge.

Dated:

San Francisco, California

this 3rd day of June, 1935.

[342]

[Title of Court and Cause.]

STIPULATION FOR APPROVAL OF NARRATIVE
STATEMENT OF EVIDENCE.

IT IS HEREBY STIPULATED that the Narrative Statement of the Evidence heretofore lodged in this Court pursuant to Supreme Court Equity Rule 75 in the above-entitled cause on May 20, 1935, may be approved by the Court as lodged, copy thereof and ten days notice of presentation to the Court for approval having been served on attorneys for Defendant on May 20, 1935.

WRAY N. HOFFMAN

WM. S. GRAHAM

Attorneys for Plaintiffs

ASA G. KAZEBEER

ARLINGTON C. WHITE

Attorneys for Defendant.

Dated:

San Francisco, Calif.,
this 31st day of May, 1935.

[Endorsed]: Filed Jun 3, 1935. [343]

[Title of Court and Cause.]

PETITION FOR APPEAL.

To the Hon. A. F. St. Sure, United States District
Judge.

The above-named Plaintiffs, FRANS VAN DER GRINTEN and CHARLES BRUNING COMPANY, INC., a corporation, feeling aggrieved by the Interlocutory Decree entered herein on the 8th day of April, 1935, does hereby Appeal from said Decree to the United States Circuit Court of Appeals for the Ninth Circuit, for the reasons set forth in the Assignment of Errors filed herewith, and prays that its Appeal may be allowed and Citation be issued as provided by law, and that a transcript of the Record, proceedings, papers and documents upon which said Decree was based, duly authenticated together with the Exhibits on file, be sent by the Clerk of this Court to the United States Circuit Court of Appeals for the Ninth Circuit under the Rules of such Court and under the statutes in such cases made and provided; and your

Petitioner further prays that the proper Order relating to the required security for costs be made.

WRAY N. HOFFMAN

WM. S. GRAHAM

Solicitors and Counsel for
Plaintiffs.

Dated: May 2, 1935.

Receipt of a copy of the within Petition for Appeal is hereby acknowledged this 1st day of May, 1935.

ASA G. KAZEBEER

ARLINGTON C. WHITE

Attorneys for Defendant.

[Endorsed]: Filed May 2, 1935. [344]

[Title of Court and Cause.]

ASSIGNMENTS OF ERRORS

Now comes FRANS VAN DER GRINTEN and CHARLES BRUNING COMPANY, INC., the Plaintiffs above-named, and assign the following as the errors upon which they will rely upon Appeal to the United States Circuit Court of Appeals for the Ninth Circuit from an Interlocutory Decree entered herein by the United States District Court for the Northern District of California on the 8th day of April, 1935, that is to say:

I.

That the Court erred in making the Decree.

II.

That the Court erred in Ordering, Adjudging, and Decreeing that Defendant had not infringed claims 3, 4, 7, 8, 16, 40 and 41 of United States Letters Patent No. 1,821,281.

III.

That the Court erred in refusing to Order, Adjudge and Decree that Defendant infringed claims 3, 4, 7, 8, 16, 40 and 41 of United States Letters Patent No. 1,821,281. [345]

IV.

That the Court erred in refusing to enjoin and restrain Defendant from infringement of claims 3, 4, 7, 8, 16, 40, and 41 of United States Letters Patent No. 1,821,281.

V.

That the Court erred in its Finding of Fact No. 22 in refusing to include in said Finding that Defendant's process and products were within claims 3, 4, 7, 8, 16, 40, and 41 of Letter Patent No. 1,821,281.

VI.

That the Court erred in holding that thiourea must act as a reducing agent when present in the background of the finished diazo type print to come within the claims of Letters Patent No. 1,821,281, particularly claims 1, 3, 4, 7, 8, 16, 25, 40, and 41 of said Patent.

VII.

That the Court erred in holding that thiourea is not such a reducing agent which remains colorless

when oxidized and which counteracts the tendency of the chemicals in the background to themselves oxidize and darken.

VIII.

That the Court erred in refusing to give to Letters Patent No. 1,821,281 in suit, the liberal interpretation to which the Court found that said Letters Patent was entitled, and in refusing to decree that the use of thiourea when used in the background of positive diazo type prints, was an equally good ingredient and accomplished the same result in the same manner as other reducing agents which were held to be an infringement of said Letters Patent.

[346]

IX.

That in respect of Letters Patent No. 1,821,281, the Court erred in its Finding of Fact No. 28 taken in its entirety as follows:

“28. That it may be that there are circumstances in which thiourea acts as a reducing agent but thiourea as used in the light sensitive layer on Defendant’s paper is not a reducing agent in connection with the chemicals present in the background of a positive diazo type print made with Defendant’s paper, although thiourea does resist discoloration of the white background of a positive diazo type print to an appreciable extent for extended periods of time when present in said background.”

and particularly that portion of said Finding No. 28 which finds that—thiourea as used in the light

sensitive layer on Defendant's paper is not a reducing agent in connection with the chemicals present in the background of a positive diazo type print made with the Defendant's paper—to which Finding Plaintiff duly excepted and the exception was allowed.

X.

That in respect of Letters Patent No. 1,821,281, the Court erred in its Conclusion of Law No. 1 in that portion thereof as follows:

“that claims Nos. 3, 4, 7, 8, 16, 40, and 41 have not been infringed by the Defendant.”

to which Conclusion of Law Plaintiff duly excepted and the exception was allowed.

WHEREFORE, the said FRANZ VAN DER GRINTEN and CHARLES BRUNING COMPANY, INC., Plaintiffs herein, pray that the said Interlocutory Decree may be reversed in respect of the errors hereinabove assigned, and affirmed as to all other matters therein, and that the said District Court of the United States for the Northern District of California, in the Southern [347] Division, be directed to enter a Decree reversing its former Decree in part and establishing infringement by the Defendant of Claims 3, 4, 7, 8, 16, 40, and 41 of the United States Letters Patent No. 1,821,281, and ordering an accounting by Defendant for infringement of said claims and further Ordering and Decreeing that the Plaintiffs are entitled to an Injunction enjoining and restraining the Defendant

from infringement of said claims and for such other and further relief as may be meet and proper.

WRAY N. HOFFMAN

WM. S. GRAHAM

Solicitors and Counsel
for Plaintiffs.

Dated: May 2, 1935.

Receipt of a copy of the within Assignment of Errors is hereby admitted this 1st day of May, 1935.

ASA G. KAZEBEER

ARLINGTON C. WHITE

Attorneys for Defendant.

[Endorsed]: Filed May 2, 1935. [348]

[Title of Court and Cause.]

ORDER ALLOWING APPEAL.

In the above-entitled cause, the Plaintiffs having filed a Petition for Appeal, together with an Assignment of Errors, now, upon Motion of the Solicitors and Counsel for said Plaintiffs,—

IT IS HEREBY ORDERED that said Appeal be, and it is hereby allowed to the United States Circuit Court of Appeals for the Ninth Circuit from the Interlocutory Decree entered herein on the 8th day of April, 1935, and that a certified transcript of the record, proceedings, papers, and documents herein be forthwith transmitted by the Clerk of this Court to the United States Circuit Court of Appeals

for the Ninth Circuit, together with all exhibits on file and that Citation be issued as provided by law.

IT IS FURTHER ORDERED that the bond on Appeal be fixed in the sum of Two Hundred and Fifty Dollars (\$250.00), to act as a bond for costs on Appeal.

CURTIS D. WILBUR
United States Circuit Judge.

Dated, May 2, 1935.

[Endorsed]: Filed May 2, 1935. [349]

[Title of Court and Cause.]

COST BOND ON APPEAL

KNOW ALL MEN BY THESE PRESENTS:

That we, CHARLES BRUNING COMPANY, INC., a corporation, as principal, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND, a corporation, as surety, are held jointly and severally and firmly bound unto DIETERICH-POST COMPANY, a corporation, in the full and just sum of Two Hundred and Fifty Dollars (\$250.00), to be paid to the said DIETERICH-POST COMPANY, a corporation, its executors, administrators, or assigns, to which payment well and truly to be made we bind ourselves, our heirs, executors, and administrators or successors, jointly and severally, by these presents. The conditions of this Bond are that:

WHEREAS, lately in the District Court of the United States for the Northern District of California, Southern Division, in a suit pending in said Court in which Frans Van der Grinten and Charles Bruning Company, Inc., were Plaintiffs, and Dieterich-Post Company, a corporation, was Defendant, a Decree was rendered in part against and in part in favor of the said Plaintiffs, and the said Plaintiffs intending to obtain from said Court an Order allowing Appeal to reverse the Decree of the aforesaid suit, and to perfect said Appeal by filing necessary papers therein and issuance of Citation directed to said Dieterich-Post Company, a [350] corporation, citing and admonishing them to be and appear at the United States Circuit of Appeals for the Ninth Circuit to be held in San Francisco in the State of California within thirty days from the date of such Citation,

NOW THEREFORE, the condition of the above obligation is such that if the said FRANS VAN DER GRINTEN and CHARLES BRUNING COMPANY, INC., a corporation, shall prosecute its said Appeal to effect and answer all costs if it fail to make its plea good, then this obligation to be void; otherwise, to remain in full force and effect; and the undersigned, surety, FIDELITY AND DEPOSIT COMPANY OF MARYLAND agrees that in case of a breach of any condition of the foregoing bond, the Court may, upon notice to it of not less than ten days, proceed summarily in the suit to ascertain the amount which such surety

is bound to pay on account of any breach of this bond and may render judgment therefor against said surety and award execution therefor.

Sealed with our seals and dated this 30th day of April in the year One Thousand Nine Hundred and Thirty-Five.

CHARLES BRUNING COMPANY, INC.

[Corporate By KNUD MURCK

Seal] Its President

FIDELITY AND DEPOSIT COMPANY
OF MARYLAND

By GUERTIN CARROLL

Its Attorney in Fact

Attest:

C. A. BEVANS

Agent

The sum of the foregoing Bond and sufficiency of the surety is hereby approved.

A. F. ST. SURE

United States District Judge.

Dated: May 2, 1935. [351]

The premium charged for this bond is \$10.00 Dollars per annum.

State of California,

City and County of San Francisco—ss:

On this 30th day of April A. D. 1935 before me Charles H. Cunningham, a Notary Public in and for the City and County of San Francisco, residing therein, duly commissioned and sworn, personally

appeared, GUERTIN CARROLL, Attorney-in-Fact, and C. A. BEVANS, Agent of the Fidelity and Deposit Company of Maryland, a corporation, known to me to be the persons who executed the within instrument on behalf of the corporation therein named and acknowledged to me that such corporation executed the same, and also known to me to be the persons whose names are subscribed to the within instrument as the Attorney-in-Fact and Agent respectively of said corporation, and they, and each of them, acknowledged to me that they subscribed the name of said Fidelity and Deposit Company of Maryland thereto as principal and their own names at Attorney-in-Fact and Agent respectively.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal at my office in the City and County of San Francisco the day and year first above written.

[Seal] CHARLES H. CUNNINGHAM,
Notary Public in and for the City and County of
San Francisco, State of California. My com-
mission expires December 26th, 1938.

[Endorsed]: Filed May 2, 1935. [352]

[Title of Court and Cause.]

STIPULATION RE PRINTING TRANSCRIPT
OF RECORD ON APPEAL.

IT IS HEREBY STIPULATED by and between the parties to the above-entitled suit that the Title and Caption of the cause on the respective papers appearing in the Transcript of Record on Appeal may be eliminated in the printing thereof, except in the case of the Bill of Complaint, and that there may be substituted therefor the following words, "Title of Court and Cause";

IT IS FURTHER STIPULATED that the complete filing reference by the Clerk on the respective papers appearing in the Transcript of Record on Appeal may be eliminated in the printing thereof and that there may be substituted therefor the word "Filed", followed by the date on which the paper was filed.

WRAY N. HOFFMAN,
WM. S. GRAHAM,
Attorneys for Plaintiffs.
ASA G. KAZEBEER,
ARLINGTON C. WHITE,
Attorneys for Defendant.

Approved May 2, 1935.

A. F. ST. SURE,
U. S. District Judge.

Dated: San Francisco, California, this 1st day of May, 1935.

[Endorsed]: Filed May 2, 1935. [353]

[Title of Court and Cause.]

ORDER RE TRANSMITTAL OF ORIGINAL
EXHIBITS.

Good cause appearing therefor, IT IS HEREBY ORDERED that the Clerk of the above-entitled Court shall transmit all of the original Exhibits, except Plaintiffs' Exhibit 6, in the above-entitled suit, both physical and documentary, to the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit for the use of that Court on the Appeal herein.

A. F. ST. SURE,
United States District Judge.

Dated: San Francisco, California, this 2nd day of May, 1935.

[Endorsed]: Filed May 2, 1935. [354]

[Title of Court and Cause.]

PRAECIPE FOR TRANSCRIPT OF RECORD
ON APPEAL.

To the Clerk of the above-entitled Court:

Please prepare Transcript of Record on Appeal in the above-entitled suit and transmit the same to the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit, including in such Record the following:

1. Amended Bill of Complaint filed April 8, 1935.

2. Amended Answer to Plaintiffs Bill of Complaint filed April 8, 1935.

3. Memorandum of Opinion of Honorable Frank H. Kerrigan, dated November 26, 1934.

4. Stipulation Relative to Bill of Particulars filed April 8, 1935.

5. Finally Approved Findings of Fact and Conclusions of Law.

6. Plaintiffs' Exceptions to Findings of Fact and Conclusions of Law.

7. Defendant's Exceptions to Findings of Fact and Conclusions of Law.

8. Order Extending Time for Entry of Decree and Stipulation.

9. Interlocutory Decree. [355]

10. Narrative Statement of Evidence, including revised Deposition of Dr. Josef Loevenich.

11. Petition for Order Allowing Appeal.

12. Order Allowing Appeal and Fixing Amount of Cost Bond.

13. Assignment of Errors.

14. Bond on Appeal.

15. Citation on Appeal.

16. Stipulation with regard to printing Transcript of Record on Appeal.

17. Order for withdrawal and transmittal of original Exhibits.

18. This Praeceptum for Transcript of Record on Appeal.

Please also transmit to the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit for use on said Appeal all the original physical and documentary Exhibits of Record in this cause as follows:

Exhibit	Plaintiffs' Exhibit
1	Letters Patent No. 1,821,281 to Van der Grinten.
2	Letters Patent No. 1,841,653 to Van der Grinten.
3	Certified copy file wrapper and contents, Patent No. 1,821,281 to Van der Grinten.
4	Certified copy file wrapper and contents, Patent No. 1,841,653 to Van der Grinten.
5	Stipulation as to receipt of notice of Infringement and also as to sale by Defendant.
6	(Omitted as it consists of Plaintiffs' Interrogatories and Defendant's Answers thereto which are a part of the permanent Record of the District Court, and the pertinent portion of which was read into the Record at the request of the trial Judge.)
7	Chart of prior art. [356]
8	Chart entitled "Invention in Patent 1,821,281."
9	Title page and pages 506 and 902 of "Modern Inorganic Chemistry" by J. W. Mellor, 1927. 1927.

Exhibit

Plaintiffs' Exhibit

- 10 Rathke article in *Berichte*, 1884, pages 297 to 309, inclusive.
- 11 Pages 10 and 11 of *Dictionary of Chemical Terms* by James H. Couch and title page and page 92 of *Funk and Wagnalls Dictionary*.
- 12 Chart of Thiourea.
- 13 Certified copy of Holland application filed December 11, 1926 and translation of same.
- 14 Certified copy of Holland application filed February 10, 1927, and translation of same.
- 15 Certified copy of Holland application filed March 16, 1927 and translation of same.
- 16 Certified copy of Holland application filed May 23, 1928, and translation of same.
- 17 German patent 56,606, with translation.
- 18 Andresen article, *Photographic Correspondenz*.
- 19 Ruff and Stein article, pages 1668 and 1670 "*Berichte*" 34, 1901, with translation thereof.
- 20 British patent 210,862.
- 21 British patent 234,818.
- 22 Circular "*Black and White Magic*" and booklet "*B. W. Instruction Manual*".
- 23 Infringement letter.
- 24 Packers memo. and invoice.
- 25 Labels attached to Defendant's paper.

Exhibit	Plaintiffs' Exhibit
26	Directions for using Defendant's developer and paper.
27	Specimen piece of Defendant's Diepo Direcprint paper. [357]
28	Specimen of Defendant's developer.
29	Chart, analysis of Defendant's paper.
30	Specimen of finished diazo type print with thiourea therein.
31	Specimen of positive diazo type print having no thiourea therein.
32	Chart showing analysis of Defendant's Developer.
33	Specimen of finished Diazo type print with sodium thiosulfate therein.
34	Specimen of diazo type print containing thiourea and sodium thiosulfate.
35	Chart showing apparatus for use in developing BW prints.
36	Defendant's advertising folder showing device for applying developer.

Exhibit	Defendant's Exhibit
A	German patent to Kalle No. 526,370, with translation.
B	File wrapper and contents patent 1,735,059, 4/1/30 to Humphrey Desmond Murray.
C	Printed copy U. S. patent 1,444,469, 2/6/23, to Kalle & Co. (Kogel, inventor.)
D	German patent 427,570, 1/7/25, to E. Gronau, with translation.
E	U. S. Patent 1,803,906, dated 5/5/31, to Kalle & Co.

Exhibit	Defendant's Exhibit
F	Lietz paper.
G	Post #500 paper.
H	Dietzgen paper.
I	Post #500 paper with Post developer and washed in hypo. [358]
J	Letter from Lietz Co. to Duncan.
K	Print made from Bruning paper.
L	Print made from Bruning paper.
M	Print made from Bruning paper and developer.
N	Letter, Renker-Belipa, 2/13/24, to Dieterich-Post.
O	Brown line print washed in plain water and not washed in hypo.
P	Brown line print washed with water and also washed in hypo and then again in water.
Q	Print made of 500 direcprint paper and developed with Defendant's developer and not washed in water.

Dated: San Francisco, California, this 20th day of May, 1935.

WRAY N. HOFFMAN,
WM. S. GRAHAM,
Solicitors and Counsel for Plaintiffs.

Receipt of a copy of the within Praecipe is hereby admitted this 20th day of May, 1935.

ASA G. KAZEBEER,
ARLINGTON C. WHITE,
Attorneys for Defendant.

[Endorsed]: Filed May 20, 1935. [359]

District Court of the United States, Northern District of California.

CERTIFICATE OF CLERK TO TRANSCRIPT
OF RECORD ON APPEAL.

I, WALTER P. MALING, Clerk of the United States District Court, for the Northern District of California, do hereby certify that the foregoing 359 pages, numbered from 1 to 359, inclusive, contain a full, true, and correct transcript of the records and proceedings in the cause entitled FRANS VAN DER GRINTEN, et al. vs. DIETERICH-POST COMPANY, In Equity No. 3493-K, as the same now remain on file and of record in my office.

I further certify that the cost of preparing and certifying the foregoing transcript of record on appeal is the sum of \$53.60 and that the said amount has been paid to me by the Attorneys for the appellants herein.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said District Court, this 26th day of June A. D. 1935.

[Seal]

WALTER B. MALING,

Clerk.

J. P. WELSH

Deputy Clerk. [360]

[Title of Court and Cause.]

CITATION ON APPEAL.

United States of America,—ss.

The President of the United States of America to
DIETERICH-POST COMPANY, a corpora-
tion,

GREETING:

YOU ARE HEREBY CITED AND ADMON-
ISHED to be and appear at a United States Cir-
cuit Court of Appeals for the Ninth Circuit, to be
holden at the City of San Francisco, in the State
of California, within thirty days of the date hereof
pursuant to an Order allowing an Appeal, of record
in the Clerk's Office of the United States District
Court for the Northern District of California,
Southern Division, wherein FRANS VAN DER
GRINTEN and CHARLES BRUNING COM-
PANY, INC., a corporation, are Appellants and you
are Appellee, to show cause, if any there be, why the
Decree or Judgment rendered against the said Ap-
pellants, as in the said Order allowing Appeal men-
tioned, should not be corrected, and why speedy
justice should not be done to the parties in that
behalf.

WITNESS, the Honorable Curtis D. Wilbur,
United States Circuit Judge for the Northern Dis-
trict of California this 2nd day of May, A. D. 1935.

CURTIS D. WILBUR,

United States Circuit Judge.

Due service and receipt of a copy of the within Citation on Appeal are hereby accepted as due personal service on behalf of the Appellee, DIETERICH-POST COMPANY, this 2nd day of May, 1935.

[Seal]

DIETERICH-POST COMPANY

By A. G. KAZEBEER

Secretary.

A.G.K.

[361]

[Endorsed]: Filed May 2, 1935.

In the United States Circuit Court of Appeals for
the Ninth Circuit.

Appeal Case

No. 7903

FRANS VAN DER GRINTEN and CHARLES
BRUNING COMPANY, INC.,

Appellants,

vs.

DIETERICH-POST COMPANY,

Appellee.

ORDER AND STIPULATION RELATIVE TO
PRINTING OF DOCUMENTARY EXHIB-
ITS IN PRINTED RECORD ON APPEAL.

IT IS HEREBY STIPULATED, subject to the approval of the Court, that the documentary exhibits of both Appellant and Appellee herein need not be printed in the printed Record on Appeal in the above entitled Court, with exception of the

(Endorsed): U. S. District Court, S. F. No. 3493. Frans vs. Dietrich. Pltf.
Exhibit No. 1. Filed Oct. 31, 1934. W. B. Maling, Clerk.

(Endorsed): No. 7903. U. S. Circuit Court of Appeals. Filed Jun. 26, 1935.

Paul P. O'Brien, Clerk.

Patented Sept. 1, 1931

1,821,281

UNITED STATES PATENT OFFICE

KAREL VAN DER GRINTEN AND LOUIS VAN DER GRINTEN, OF VENLO, NETHERLANDS, ASSIGNORS TO FRANS VAN DER GRINTEN, TRADING AS CHEMISCHE FABRIEK L. VAN DER GRINTEN, OF VENLO, NETHERLANDS

MANUFACTURE OF DIAZO-TYPES

No Drawing. Application filed June 6, 1927, Serial No. 196,993, and in the Netherlands December 11, 1926.

This invention relates to the production of diazo-types in which layers containing diazo-compounds which are stable in the dark but are decomposed by light, are exposed to light through a transparent original and are then developed.

The sensitive layer is spread on suitable carriers such as paper or the like. The papers or the like thus obtained are suitable for making reproductions of transparent images such as drawings, photographs and the like.

It is well known that the usefulness of the process depends on the fact that in the illumination of the sensitive layer through a transparent picture or the like the diazo-compound is decomposed (probably with formation of a phenol) at the places where the light has been able to pass, so that formation of an azodyestuff with an azodyestuff coupling component is no longer possible, whereas at the places at which the light cannot pass the diazo-compound remains unaltered and can be coupled under suitable conditions with a coupling component to form an azodyestuff.

In sensitive layers in which the azo component is present together with the diazo compound a simple development by alkali suffices, for instance with gaseous ammonia or a similar volatile base. If the sensitive layer does not contain an azo-component the colour will be obtained by treating with a mixture of alkali and an azo-component.

The image obtained is positive when a transparent positive has been used. The development causes also the fixation of the image because a further action of light will not alter it.

The first technical process for obtaining positive copies was that of Green, Cross & Bevan (German Patent 56,606 of September 3rd, 1890) who used the diazo derivative of the dyestuff primuline as a sensitive substance and after exposure to light through a transparent original developed in a bath containing an azo-dyestuff component and generally an alkali.

Later it was found by Andresen, photographic correspondenz, 1895, Ruff and Stein Berichte 34, 1901, 1668, and others that not

only diazo derivatives of primuline are suitable in this process, but many other diazo compounds and that all diazo compounds are more or less sensitive to light. Ruff and Stein also used metal salts in the sensitive layer and salt in the developing bath.

Kalle, British Patent No. 210,862, discovered that diazo anhydrides are very stable diazo compounds and suitable in the positive diazo-type process and that these diazo compounds may be used together with azo-components in the same layer, because they are very stable against coupling. In this case development is effected with alkali alone, preferably with ammonia vapors. In a later patent Kalle, British Patent No. 234,818, describes that instead of diazo anhydrides other diazo compounds may be used with azo components in the same sensitive layer, provided that they do not couple per se in an acid or a neutral condition with any azo dyestuff component either in the dark or in the light. In another patent Kalle, Dutch Patent 14,150, mentions chinone-diazides as suitable diazo compounds. All these processes are imperfect because they do not produce sufficiently dark lines with a sufficiently clear bleached background and the background is liable to discolor in course of time.

It has now been found that aromatic diazo-compounds containing a tertiary nitrogen atom in the para-position to the diazo-group, such compounds being incapable of forming diazo-anhydrides or quinoxalidiazides in any sense and not containing other substituents which might form anhydrides with the diazo-group, such as hydroxyl-carboxyl-, primary and secondary amino or sulphonic acid groups, are also very sensitive to light and stable; they have the advantage to give rise to dark colours in the unexposed parts and to practically absolute whiteness in the exposed parts.

This complete bleaching comprises ipso facto that the respective diazo-compounds do not couple quickly in the medium in which they are present, because otherwise with the phenol they produce they would form an azodyestuff during bleaching (which as a rule will be an azo-component very capable of

coupling) before the whole quantity of diazo-compound would be decomposed. Of course a white ground would then not be obtained.

When using diazo compounds which bleach completely when exposed to light, it is therefore always possible to use an azo dyestuff coupling component together with the diazo-compound in the light sensitive layer. However, with most diazo compounds and, also, with the abovementioned diazonium compounds, having a tertiary nitrogen atom in para-position to the diazo group, the difficulty arises that if they are used together with an azo dyestuff component in the light sensitive layer, coupling cannot be prevented for a long time even in the usual acid medium, and when the paper is stored the sensitive layer will become coloured and unfit for use after a relatively short time (a few days or even hours).

Though therefore the diazonium compounds having in para-position to the diazo group a tertiary nitrogen atom are excellent if the azo dyestuff component is added during development they are less fit to be used without further precaution together with diazo compounds in the light sensitive layer.

It has been tried to reduce the tendency to coupling of these diazo compounds by introducing in the benzene nucleus which contains the diazo group other substituents such as halogens, alkyls, aralkyls, etc. By introducing such substituents it is possible to influence certain properties such as the darkness of color, the rapidity of development, etc., and also to reduce the tendency to coupling to a degree but it is not possible to reduce the tendency to coupling sufficiently for common practice.

Diazotype copies obtained from a sensitive layer containing diazonium compounds having in para position to the diazo group a tertiary bound nitrogen atom, will have the same disadvantage as other diazotypes of becoming yellow or brownish during storage. This defect is inherent to all known diazotype processes in more or less degree.

According to the invention this defect has been overcome not only in the preferably used diazotype process in which diazonium salts, having in para position to the diazo-group a tertiary bound nitrogen atom, and which do not contain groups which might give rise to the forming of anhydrides, are used but in diazotype processes generally.

The invention is based on the observation that the discoloration of the background in all kinds of diazotype processes can be prevented even for extended periods if a reducing agent is added to the sensitive layer, or during or after development of the picture.

Preferred reducing agents are organic substances such as aldehydes, amino compounds, aliphatic amido-compounds, poly-oxy-compounds or the like, and the reducing agents

are preferably used together with very small quantities of the substances with catalytic action defined as "anti-oxygènes" by Moureu (*Chemisch Zentralblatt* 1922 I 1317; *Comptes Rendus* 174 pages 258-264 and following).

If the reducing agents are added to the sensitive layers together with the other constituents the additional advantage is obtained that the small discolouring effect due to the oxidation of the components of the layer which may occur during long storage of it in the unexposed state is also prevented.

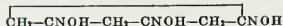
The addition of reducing agents makes it possible to maintain the required white background and thereby improve the use of the abovementioned diazonium-compounds containing in para-position to the diazo-group a tertiary nitrogen atom as a substituent, but it does not make it possible to use always a developing process with alkali alone, except with freshly-made sensitive layers, because this development requires a sensitive layer containing all ingredients necessary to form an azo-dyestuff and the resistance to coupling of such layers is not improved sufficiently by the aforesaid reducing agent.

By the present invention, however, these difficulties are also avoided in an original manner, so that it is possible to use diazo-compounds which show no great resistance to coupling in practical admixture with azo-dyestuff components and acids which are not injurious to paper. Thus one is less limited in the choice of the diazo-compounds. One can advantageously use such diazo-compounds as, like the aforesaid diazonium salts, contain a tertiary nitrogen atom as a substituent in the para-position to the diazo-group and form with suitable azo-dyestuff components the desired dark tone on a completely white ground.

According to the invention for the purpose in question there is used in the light sensitive layer not an azo-coupling component, but a non-coupling compound which however in the development of the photoprint with an alkali is converted into a coupling component. Such compounds may be obtained for instance by the action on a coupling component of an agent which inhibits the phenol-function. As an example of such an agent hydroxylamine may be cited. The agent may be added to the mixture of diazo-compound and azo-coupling component with which the sensitive layer is produced but it may also be caused to react previously with the azo-dyestuff component so as to form a derivative of this component having no tendency to couple, which derivative, however, under certain conditions, such as the combined action of a diazo-compound and an alkali reverts to its components.

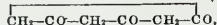
For example, by the action of hydroxylamine

ine on phloro-glucinol, the known triketohexamethylenetrioxime



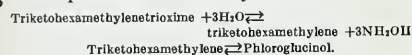
is formed (Adolf Bayer, Ber. 19, 159).

When this compound is decomposed there is formed the triketone:



which is tautomeric with phloro-glucinol.

When the triketohexamethylenetrioxime is present in the sensitive layer, the following reaction may be supposed to occur during the development of the azo-dyestuff:



The equilibrium in the first reaction is practically complete on the left hand side under conditions under which the paper is stored. On treatment with an alkali the coupling of the phloro-glucinol with the diazo-compound which then occurs shifts the equilibrium of the second reaction and thereby also that of the first towards the right which soon leads to the complete consumption of the trioxime with formation of azo-dyestuff. For appreciating this equilibrium it may be remarked that mixtures of active coupling diazo-compounds with phloro-glucinol can be stored only for a few days or even less, whereas mixtures in which the phloro-glucinol is exchanged for an equivalent quantity of triketohexamethylenetrioxime but are otherwise the same remain permanent under like conditions for months; both mixtures couple on treatment with, for instance, gaseous ammonia, only the coupling in the latter case proceeds somewhat more gradually. Besides triketohexamethylenetrioxime there will probably be formed in a diluted solution of phloroglucinol and hydroxylamine other non-coupling compounds (for instance a compound of the composition



or such products will be formed as intermediate products in the conversion of the oxime into the coupling component phloroglucinol. It must be added that in the use of all these products, there must be present in the development some water in order to induce decomposition. In practice there is a sufficient quantity of water present in the paper and in the ammonia vapour.

In the case of necessity the ammonia vapour may be prepared intentionally moist. With sufficient excess of hydroxylamine, which may be added, for example, in the form of hydroxylamine-hydrochloride, the latter forms compounds not only with the phloro-glucinol but also with azo-coupling components in general (phenols), to form compounds (probably oximes derived from

the ketoform of the phenol in question) which do not have a tendency to couple, although by combined action of a diazo compound and an alkali they pass into compounds which do have this tendency.

To facilitate the formation of the hydroxylamine compound which does not have a tendency to couple and to hinder decomposition of this compound into the coupling component and hydroxylamine during storage, it is advantageous to use an excess of hydroxylamine and to protect the paper from damp. Because the formation of the hydroxylamine compound occurs only slowly the presence of the excess of hydroxylamine has no disadvantageous effect on the speed of development with alkali.

As a further example of a substance capable of converting azodyestuff components in a non-coupling condition semi-carbazide is mentioned.

The action of the substances such as hydroxylamine and semi-carbazide prevents the coupling in the sensitive layer by an action on the azodyestuff component. Though the action of hydroxylamine and phloro-glucinol may be explained as indicated above it is not proved that this reaction really takes place. It may be that other products are formed.

The action on other phenolic bodies by which the tendency of coupling is removed, may be of a similar character or of another character. It may be that compounds of hydroxylamine with many phenols have a purely aromatic constitution, but in all such compounds the phenolic function is inhibited.

In all cases the conversion of the non-coupling compounds into azo-coupling components occurs in one single operation with the development of the photo print. With advantage gaseous ammonia is used but of course it is also possible to develop in an alkaline bath.

It has further been found that the print may be developed with a pulverized alkaline substance strewn on the image. Care should be taken that sufficient moisture is present because in dry condition the development proceeds too slowly. A suitable alkaline substance for this purpose is sodium stannate.

Under certain conditions the development may be carried out in still another way:—

It has been found that by using a mixture of a diazo-compound with a compound produced by the action of an azo-coupling component with a substance such as hydroxylamine which inhibits the phenolic function, the picture can be developed without the addition of an alkali. In this case the sensitive layer must contain a salt of a strong base with a volatile feeble acid, or with an acid capable of being decomposed by heat. In this case a rapid development is possible by mere heating. The hydroxylamine compound is decomposed by the heat-

ing and the tendency of the azo-component to couple is therefore restored. In this manner the feeble acid or the acid decomposable by heat combined with a strong base is expelled and with it the effect of the acid residue in the diazonium compound. The medium thus becomes neutral or feebly alkaline which at raised temperature induces a rapid coupling.

In this process in which the presence of the decomposable salt requires a high resistance against coupling during storage, it is advantageous to use diazonium salts having in para-position to the diazogroup a tertiary nitrogen atom as a substituent and in which the benzene nucleus containing the diazo group has still one or more other substituents.

In order to prevent the so-called bleeding of the formed azo-dyestuff it is preferable to add salts like barium chloride. If the development is carried out in a bath, for example a bath containing an azo-coupling component, the salt may be added to the bath. In most cases however it is preferable to bring it together with the other components in the sensitive layer.

The following examples illustrate the invention, the parts being by weight:—

Example 1.—There is made a solution of 2 parts of 1-dimethylaminobenzene-4-diazonium chloride by diazotizing para-aminodimethylaniline with nitrous acid in 100 parts of water. To this solution is added 0.2 part of oxalic acid and 10 parts of barium chloride.

The solution is brushed on paper and dried. After exposure under a transparent original the paper is developed in a feebly alkaline solution of β -oxynaphthoic acid anilide, to which 0.4% of formaldehyde has been added.

There is obtained a positive brown-violet image on a white ground; which does not become yellow on keeping. Preferably, it is afterwards washed in a solution of formaldehyde of 0.4% strength.

Example 2.—There is made a solution of 30 parts of 1-diisooamylamine-3:5-xylenediazoniumchlorostannate, 5 parts of phloroglucinol and 5 parts of hydroxylamine hydrochloride in 1000 parts of water.

The solution is applied as described in Example 1.

The picture is developed in a solution containing 0.2 per cent. of sodium hydroxide and 0.4 per cent. of formaldehyde. There is obtained a positive which is black and does not become yellow on keeping.

Example 3.—There is made a solution of 0.2 part of phloroglucinol in 100 parts of water and there is added so much hydroxylaminehydrochloride that the reaction of phloroglucinol described in Berichte, vol. 8, page 967 and vol. 9 page 216 has disappeared from test samples. (The reaction in question is

best performed as follows:—To prepare the reagent 0.2 gram of aniline-hydrochloride and 0.1 gram of sodium nitrite are together dissolved in 100 cc. of water. After a long time a brown precipitate is formed which is filtered in order to obtain a clear filtrate constituting the reagent. To make the test, 2 drops of the reagent are added to the phloroglucinol solution, previously diluted to 10 cc. In presence of phloroglucinol there appears within 10 seconds a distinct yellow colour).

To this solution are then added under ordinary circumstances 1.5 parts of dimethylaminobenzene-4-diazoniumchlorostannate, 2 parts of oxalic acid, 2 parts of ammonium lactate, 1 part of urotropin, 2 parts of glycerine aldehyde, 0.02 part of pyrogallol and 0.01 part of metaphenylenediamine hydrochloride.

The solution is painted on paper and dried. After exposure under a drawing on transparent paper the picture is developed during 15–30 minutes in a chamber which contains ammonia vapour. There is obtained a practically black picture on a completely white ground, which does not become yellow.

Example 4.—The following solution is made:

30 parts of 1-diisooamylamine-3:5-xylene-diazoniumchlorostannate,
5 parts of phloroglucinol,
30 parts of oxalic acid,
20 parts of ammonium lactate,
20 parts of urotropin,
20 parts of glycerine aldehyde,
0.2 part of pyrogallol,
0.1 part of meta-phenylenediamine hydrochloride.

The solution is painted on paper and dried. The paper is only permanent for a relatively short time. After exposure under a drawing on transparent paper it is developed for 15–30 minutes in a chamber containing ammonia vapour.

There is obtained a practically black picture on a white ground which does not become yellow.

Example 5.—A solution is made of:
1.5 parts of 1-dimethylaminobenzene-4-diazoniumchlorostannate,
0.8 part of triketohexamethylenetrixime,
0.3 part of hydroxylamine hydrochloride,
2 parts of oxalic acid,
2 parts of ammonium lactate,
1 part of urotropin,
2 parts of glycerine aldehyde,
0.01 part of meta-phenylenediamine,
100 parts of water.

The solution is painted on paper and dried. After exposure under a drawing on transparent paper the picture is developed for about 15–30 minutes in a chamber containing ammonia vapour. There is obtained a black brown picture on a white ground, the latter remaining white during storage.

Example 6.—The procedure is as described in Example 3. The picture obtained, however, is not developed by ammonia vapour but by friction with pulverulent sodium stannate.

Example 7.—The procedure is as described in Example 3, but a larger proportion of hydroxylamine hydrochloride is added and instead of 2 parts of oxalic acid there are used 3 parts of sodium acetate. The drying operation is performed particularly carefully at a low temperature. After exposure, the picture is developed by heating it, for example with a hot smoothing iron.

What we claim is:—

1. The process of rendering the back-ground of the diazo type prints substantially stable against discoloration which comprises including therein a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

2. The process of rendering the back-ground of the diazo type prints substantially stable against discoloration which comprises including therein a substance comprising a reducing agent, and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

3. The process of rendering the back-ground of the diazo type prints substantially stable against discoloration which comprises including therein a reducing aliphatic compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

4. The process of rendering the back-ground of the diazo type prints substantially stable against discoloration which comprises including therein a reducing amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

5. The process of rendering the back-ground of the diazo type prints substantially stable against discoloration which comprises including therein an aldehyde capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

6. The process of rendering the back-ground of the diazo type prints substantially stable against discoloration which comprises including therein a reducing polyoxy compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

7. The process for making diazo type prints which comprises applying to a base a

layer containing a diazo compound bleaching on exposure to light, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints, exposing such layer, and contacting the exposed layer with a developer containing an azo dyestuff component.

8. The process according to claim 7 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

9. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said print, exposing such layer, and contacting the exposed layer with a developer containing an azo dyestuff component.

10. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, an azo dyestuff component and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints, exposing such layer, and developing the exposed layer.

11. The process according to claim 10 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

12. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, an azo dyestuff component and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints, exposing such layer, and developing the exposed layer.

13. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, a non-coupling compound decomposable into an azo dyestuff component and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints, exposing such layer, and developing the exposed layer.

14. The process according to claim 13 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the compo-

nents forming the back-ground of said prints.

15. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, a non-coupling compound decomposable into an azo dyestuff component, and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Mouren" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said print, exposing such layer, and developing the exposed layer.

16. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said print, exposing such layer, and contacting the exposed layer with a developer containing an azo dyestuff component and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

17. The process according to claim 16 wherein the reducing agent in both instances is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

18. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints, exposing such layer, and contacting the exposed layer with a developer containing an azo dyestuff component, and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

19. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, an azo dyestuff component, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints, exposing such layer, and contacting the exposed layer with a developer containing a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

20. The process according to claim 19 wherein the reducing agent in both instances is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

21. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, an azo dyestuff component and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints, exposing such layer, and contacting the exposed layer with a developer containing a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

22. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, a non-coupling compound decomposable into an azo dyestuff component and a reducing agent capable of arresting under normal conditions the discoloration of the components of the back-ground of said prints, exposing such layer, and contacting the exposed layer with a developer containing a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

23. The process according to claim 22 wherein the reducing agent in both instances is an amino compound capable of arresting under normal conditions the discoloration of the components of the back-ground of said prints.

24. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, a non-coupling compound decomposable into an azo dyestuff component and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints, and contacting the exposed layer to a developer containing a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

25. The process for making diazo type prints which comprises applying to a base

a layer containing a diazo compound bleaching on exposure to light, exposing such layer, and contacting the exposed layer with a developer containing an azo dyestuff component and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

26. The process according to claim 25 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

27. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, exposing such layer, and contacting the exposed layer with a developer containing an azo dyestuff component and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

28. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, and an azo dyestuff component, exposing such layer, and contacting the exposed layer with a developer containing a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

29. The process according to claim 28 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

30. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, and an azo dyestuff component, exposing such layer, and contacting the exposed layer with a developer containing a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

31. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light and a non-coupling compound decomposable into an azo dyestuff component, exposing such layer, and contacting the exposed layer with a developer containing a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

32. The process according to claim 31 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

33. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light and a non-coupling compound decomposable into an azo dyestuff component, and contacting the exposed layer with a developer containing a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints.

34. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, an azo dyestuff component, a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints, and a salt yielding upon heating an alkaline material, exposing such layer, and developing the exposed layer by heat.

35. The process according to claim 34 wherein the salt is a salt of a strong base with a volatile acid which salt upon heating yields an alkaline material.

36. The process according to claim 34 wherein the salt is a salt of strong base with a heat decomposable acid which salt upon heating yields an alkaline material.

37. The process for making diazo type prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, a non-coupling compound decomposable into an azo dyestuff component, a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of said prints, and a salt yielding upon heating an alkaline material, exposing such layer, and developing the exposed layer by heat.

38. The process according to claim 37 wherein the salt is a salt of a strong base with a volatile acid which salt upon heating yields an alkaline material.

39. The process according to claim 37 wherein the salt is a salt of a strong base with a heat decomposable acid which salt upon heating yields an alkaline material.

40. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching upon exposure to light, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

41. The product according to claim 40 wherein the reducing agent is an amino com-

pound capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

42. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching upon exposure to light, and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

43. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching upon exposure to light and containing in the para-position to the diazo group a tertiary nitrogen atom substituted in the benzene nucleus or not but not containing a substituent which can react with the diazo group, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

44. The product according to claim 43 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

45. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching on exposure to light and containing in the para-position to the diazo group a tertiary nitrogen atom substituted in the benzene nucleus or not but not containing a substituent which can react with the diazo group, and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

46. As a new product, a base having a sensitive layer thereon containing a diazo compound, an azo dyestuff component, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

47. The product according to claim 46 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

48. As a new product, a base having a sensitive layer thereon containing a diazo compound, an azo dyestuff component, and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions

the discoloration of the components forming the back-ground of the finished print.

49. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching on exposure to light and containing in the para-position to the diazo group a tertiary nitrogen atom substituted in the benzene nucleus or not but not containing a substituent which can react with the diazo group, an azo dyestuff component, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

50. The product according to claim 49 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

51. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching on exposure to light and containing in the para-position to the diazo group a tertiary nitrogen atom substituted in the benzene nucleus or not but not containing a substituent which can react with the diazo group, an azo dyestuff component, and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

52. As a new product, a base having a sensitive layer thereon containing a diazo compound, a non-coupling compound decomposable into an azo dyestuff component, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished product.

53. The product according to claim 52 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

54. As a new product, a base having a sensitive layer thereon containing a diazo compound, a non-coupling compound decomposable into an azo dyestuff component, a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

55. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching on exposure to light and containing in the para-position to the diazo group a tertiary nitrogen atom substituted in the benzene nucleus or not but

not containing a substituent which can react with the diazo group, a non-coupling compound decomposable into an azo dyestuff component, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

56. The product according to claim 55 wherein the reducing agent is an amino compound capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

57. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching on exposure to light and containing in the para-position to the diazo group a tertiary nitrogen atom substituted in the benzene nucleus or not but not containing a substituent which can react with the diazo group, a non-coupling compound decomposable into an azo dyestuff component, and a substance comprising a reducing agent and a catalytically active material termed "antioxygene of Moureu" which substance is capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

58. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching on exposure to light, and a non-coupling compound decomposable into an azo dyestuff component.

59. The product according to claim 58 wherein the non-coupling compound is the reaction product of an azo dyestuff component and a substance inhibiting the phenol function of said azo dyestuff component.

60. The product according to claim 58 wherein the non-coupling compound is the reaction product of an azo dyestuff component and hydroxylamine.

61. The product according to claim 58 wherein the non-coupling compound is the reaction product of an azo dyestuff component and semicarbazide.

62. The product according to claim 58 wherein the non-coupling compound is the reaction product of phloroglucinol and hydroxylamine.

63. The product according to claim 58 wherein the non-coupling compound is the reaction product of phloroglucinol and semicarbazide.

64. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching on exposure to light and containing in the para-position to the diazo group a tertiary nitrogen atom substituted in the benzene nucleus or not but not containing a substituent which can react with the diazo group, and a non-coupling compound decomposable into an azo dyestuff component.

65. The product according to claim 64 wherein the non-coupling compound is the reaction product of an azo dyestuff component and a substance inhibiting the phenol function of said azo dyestuff component.

66. The product according to claim 64 wherein the non-coupling compound is the reaction product of an azo dyestuff component and hydroxylamine.

67. The product according to claim 64 wherein the non-coupling compound is the reaction product of an azo dyestuff component and semicarbazide.

68. The product according to claim 64 wherein the non-coupling compound is the reaction product of phloroglucinol and hydroxylamine.

69. The product according to claim 64 wherein the non-coupling compound is the reaction product of phloroglucinol and semicarbazide.

70. The process of rendering a sensitive layer containing a diazo compound bleaching upon exposure to light and an azo dyestuff component substantially stable against premature coupling which comprises including therein a reducing agent other than an acid capable of arresting the coupling activity of the components of said layer.

71. The process according to claim 70 wherein the reducing agent is hydroxylamine.

72. The process according to claim 70 wherein the reducing agent is semicarbazide.

73. The process of rendering a sensitive layer comprising a diazo compound bleaching upon exposure to light containing in the para-position to the diazo group a tertiary nitrogen atom substituted in the benzene nucleus or not but not containing a substituent which can react with the diazo group and an azo dyestuff component, substantially stable against premature coupling which comprises including therein a reducing agent other than an acid capable of arresting the coupling activity of the components of said layer.

74. The process according to claim 73 wherein the reducing agent is hydroxylamine.

75. The process according to claim 73 wherein the reducing agent is semicarbazide.

76. The process of rendering a sensitive layer containing a diazo compound bleaching upon exposure to light and phloroglucinol substantially stable against premature coupling which comprises including therein a reducing agent other than an acid capable of arresting the coupling activity of the components of said layer.

77. The process according to claim 76 wherein the reducing agent is hydroxylamine.

78. The process according to claim 76 wherein the reducing agent is semicarbazide.

79. The process of rendering a sensitive layer comprising a diazo compound bleaching upon exposure to light containing in the para-position to the diazo group a tertiary nitrogen atom substituted in the benzene nucleus or not but not containing a substituent which can react with the diazo group, and phloroglucinol substantially stable against premature coupling which comprises including therein a reducing agent other than an acid capable of arresting the coupling activity of the components of said layer.

80. The process according to claim 79 wherein the reducing agent is hydroxylamine.

81. The process according to claim 79 wherein the reducing agent is semicarbazide.

In testimony whereof we affix our signatures.

KAREL VAN DER GRINTEN.
LOUIS VAN DER GRINTEN.

COPY OF PATENT NO. 1,841,653

PLAINTIFFS' EXHIBIT NO. 2

(Endorsed): U. S. District Court, S. F. No. 3493. Frans vs. Dietrich. Pltf.
Exhibit No. 2. Filed Oct. 31, 1934. W. B. Maling, Clerk.

(Endorsed): No. 7903. U. S. Circuit Court of Appeals. Filed Jun. 26, 1935.
Paul P. O'Brien, Clerk.

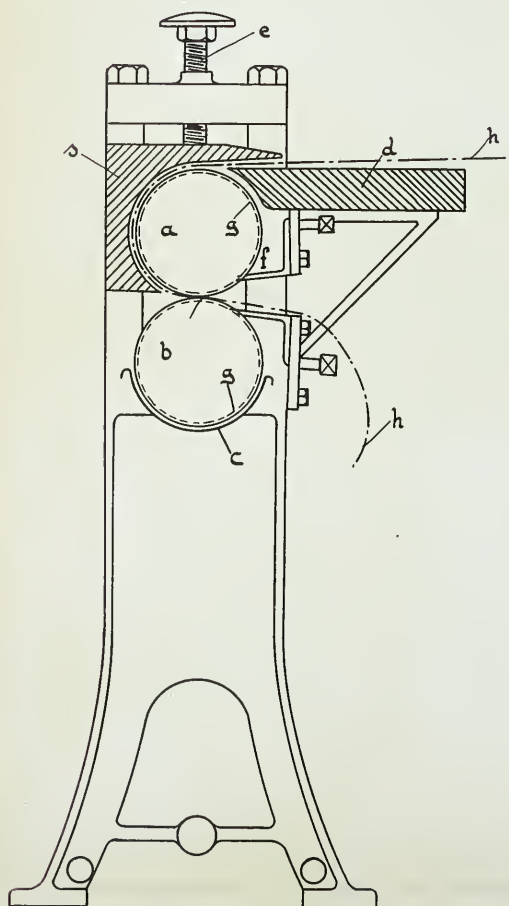
Jan. 19, 1932.

L. P. F. VAN DER GRINTEN ET AL

1,841,653

PROCESS FOR DEVELOPING POSITIVE DIAZO PRINTS

Filed Aug. 11, 1928



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PROCESS FOR DEVELOPING POSITIVE DIAZO PRINTS

Application filed August 11, 1928, Serial No. 299,042, and in the Netherlands August 22, 1927.

It is common knowledge that the positive diazo printing process is based on two properties of the diazo compounds:

(a) Their sensitiveness to light. The diazo compounds are decomposed (probably and on the whole into phenols) by exposure to light;

(b) Their property of forming azo dyes with substances known as azo-dye components.

Reaction (b) takes place mostly with the co-operation of alkalis. In the photographic diazo printing process, a film containing a diazo compound and generally disposed on paper is exposed to light under a transparent image, drawing or tracing, so that the diazo compound is decomposed on those areas of the film which are reached by light.

An azo dye is formed in the areas which are unaffected by light (and in which the diazo compound has remained unaltered) by treating the exposed film with an azo-dye component and alkali, while the areas which have been exposed to light remain colourless when treated in this manner. The image is simultaneously fixed, because after being subjected to this treatment (which may be also considered as a developing treatment) the image-forming areas (now containing a dye) as well as the background reached by light, are stable under any further action thereof. The positive diazo-printing process does not involve a separate fixing operation, which is necessary in most of the other photographic processes and which usually consists in removing either non-decomposed light-sensitive initial materials or certain substances formed by the action of light. In the positive photographic diazo printing process, the developing operation (which is simultaneously a fixing operation) consists exclusively in the addition of substances. It is in fact sufficient to add an alkali for developing purposes when the azo-dye components are initially embodied in the light-sensitive film, this being made possible in practice by using certain diazo compounds such as for example diazo anhydrides. The simplest known manner in which the alkali may be added is to subject the exposed sensitive film to the action of gaseous

ammonia, the prints being disposed in a developing tank containing ammonia vapour. The advantage of this method of proceeding is that developing baths are dispensed with, so that the pictures thus developed need not be dried.

This developing method has however the following disadvantages:

(a) The developing operation is comparatively lengthy, especially in the winter. At low temperature, the prints must remain in the ammonia-charged atmosphere for half an hour or more in order to be fully developed.

(b) When no complicated mechanical apparatus is used, this developing operation is highly tedious because of the unpleasant and injurious alkaline vapours.

The developing tanks must therefore be often in the open and the prints developed smell of ammonia for a long time.

These two main disadvantages are the reason why the diazo printing process with what is known as dry development is not used in practice as widely as the simplicity of the process might have warranted.

The above disadvantages are not to be found in the method of developing diazo prints in baths (described for example in Eder's "Handbuch der Photographie", 1899, pages 563-565, and in "Photographische Korrespondenz", 1895, pages 284-285) because (a) the print may be developed in a few seconds, and (b) non-volatile alkalis may be used which evolve no offensive and injurious vapours.

This method however lacks the characteristic advantages inherent in dry development with the aid of vapours. Moreover, a difficulty involved in the use of baths is that the always more or less soluble azo-dyes merge one into the other, with the result that the images obtained are not sharp and the clearness of the background is affected.

The present process has the advantages of both the methods described in the foregoing while their disadvantages are entirely avoided. According to the present invention, an extremely thin layer of an alkaline liquid (which if necessary may contain an azo-dye component) is uniformly spread over the

whole area to be developed. Friction may be avoided, in which case the procedure consists in applying an extremely thin layer of the developing liquid on the surface to be developed. This makes it possible:

(a) To develop in a few seconds;

(b) To avoid offensive vapours by using non-volatile alkalis;

(c) To use a very thin layer of liquid, so that the prints remain dry and the colours do not merge;

(d) To use diazo compounds (by applying the alkaline developer together with the azo-dye components) which cannot be used (or can be used only under certain conditions) together with azo-dye components in the light-sensitive film, whereby the selection of diazo compounds is very large.

In the accompanying drawing, the single figure is a side view, partly in vertical section, of an apparatus for applying the developer.

This apparatus, which is of extremely simple character, comprises two vertically superposed and rubber-covered rolls *a* and *b*, the lower roll *b* revolving in a trough *c* containing the developing liquid and the upper roll bearing on the lower one by gravity or being pressed (hard when necessary) thereon by suitable means such as for example screws (e) acting upon the bearings of the roll. The lower roll is driven while the upper roll is preferably moved at the same peripheral velocity so that there is no friction at the line of contact.

The lower rubber roll *b* collects, while rotating, developing liquid from the trough *c* and conveys it to the line of contact of the two rolls. Here the liquid is practically entirely retained and flows back uniformly.

This extremely simple apparatus comprises moreover a small table *d* disposed in front of the upper roll and fitted with a simple guiding and flattening device *s* to prevent creases from being formed. A stripper may be advantageously provided to prevent the paper from adhering to the rolls. This stripper may be constituted by blades *f* projecting as far as the grooves *g* of the rolls.

When a print is passed between the two rolls with the side to be developed facing downwards, the said side is wetted by the developing liquid for a very short instant and is pressed between the two rubber rolls immediately after. To this end, the print *h* is laid on the table *d* with the image side upwards and is pushed between the upper roll *a* and the flattening device *s*; the roll *a* picks up the print and conveys it through the rolls *a* and *b*.

The print comes out at the other side between the rolls; it carries a sufficient quantity of developer and is practically dry. The chemical development reaction now takes place within a very short time (a few minutes

at most) in the film thus treated. There is however no necessity to wait, because the print develops of itself without further supervision.

Four metres of prints may be easily developed per minute when the width is suitable (usually 100 cm.). This rate of operation may be considerably increased by using a very concentrated developing liquid; it is also possible however, to work, if required, at a slower rate by using more dilute developers.

For small installations this simple apparatus may be replaced by smaller, simpler and cheaper means with the aid of which it is likewise possible to provide the light print with a uniform thin layer of developing liquid.

The developers which may be used according to this invention are aqueous solutions of alkalis or alkaline-reacting substances, mixed if necessary with azo-dye components such as phloroglucinol, resorcinol, resorcinic acids, naphthols, phenols, naphthol-sulphonic acids and the like. Should the light-sensitive film be devoid of substances preventing the prints from turning yellow, such substances may also be added to the developer.

The substances which prevent the prints from turning yellow may be incorporated in the light-sensitive film as well as in the developing liquid. As a general rule, reducing substances which are stable in an acid medium are preferably used in the light-sensitive film and those which are stable in an alkali medium are used in the developing liquid.

The alkaline substances used may advantageously be potassium carbonate, sodium carbonate and ammonium carbonate (the latter not so much to be recommended because it has a smell of ammonia) preferably mixed with buffer salts such as secondary phosphates, secondary citrates and generally salts of polyvalent weak acids and the like.

Buffer salts are salts by which the intensity of the alkaline reaction is decreased without affecting the potential alkaline reaction, especially salts of polyvalent acids, such as phosphoric acid, citric acid and the like, and salts having a neutral reaction, such as secondary sodium phosphate; which salt, for instance, if added to an alkali solution, forms tertiary phosphate. Said salt has an alkaline reaction, but in the presence of an excess of secondary salt the concentration of the OH-ions, which causes the intensity of the alkaline reaction, is very considerably decreased with respect to the original alkali solution and yet its alkaline action (capacity of neutralizing acids) remains the same.

In order that the printing may be as uniform as possible, a wetting agent such as alcohol, glycerine, Turkey-red oil and the like may be added to the developing liquid.

Example 1.—Prints obtained by exposing diazo-printing paper the light-sensitive film of which contains 1.dimethylamino.2.chlorobenzene.4.diazonium chloride, or 4.diethylamino-benzol-diazonium chloride, are printed with a developer by being guided between the rubber-covered rolls described in the foregoing. The said developer is an aqueous solution of 20 parts by weight of potassium carbonate, 30 parts by weight of disodium phosphate and 1.2 parts by weight of phloroglucinol, so that the print is developed. Positive images are thus obtained in dark to black colour on a light background. In the developer, the 1.2 parts by weight of phloroglucinol may be replaced by 4 parts by weight of resorcinol, 5 parts by weight of β -naphthol, 5 parts by weight of β -oxy-naphthoic acid anilide, 3 parts by weight of 2.7.dioxynaphthaline and the like. These are then dissolved in quantities of soda lye sufficient for dissolution and yield images in various dark colours.

In a similar manner, the potassium carbonate may be replaced by sodium carbonate or ammonium carbonate while disodium phosphate may be replaced by disodium citrate or the like.

The following may be added to the developer to prevent the print from turning yellow: 0.4% of formalin or 1% of urotropin and the like; or 5% of glucose, 2% of sodium lactate, 0.1% of pyrogallol.

The uniform spreading of the developer on the paper is assisted with 5% of methylated alcohol or 3% of glycerine or 1% of Turkey-red oil and the like.

Example 2.—A solution is made, which contains 1.8% of 1.diethyl-aminobenzol.4.diazonium chlorostannate and 1% of potassium sulphate. The solution is spread on paper and the like, and dried. After exposure under a drawing of transparent paper, a thin layer of an aqueous solution of 5% of potassium carbonate, 0.5% of phloroglucinol, 0.5% of resorcinol, 10% of potassium chloride, 10% of sodium citrate, 10% sodium hyposulphate and 10% of glucose is uniformly spread over the whole surface of the print with the apparatus shown. An entirely black picture is obtained, which is very stable against any tendency to become yellow, which would not be the case without the reducing means (citrate, hyposulphite and glucose).

Example 3.—A thin layer of a developing liquid constituted by an aqueous solution of 40 parts by weight of potassium carbonate and 60 parts by weight of disodium phosphate is spread as in Example 1 on prints obtained by exposing diazo printing papers containing 1.5 parts by weight of 2.7.dioxynaphthaline and 3% of oxalic acid to 5 parts by weight of 1.dimethylamino.3.5.xylo.4.diazonium chlorostannate; or 0.5 parts by weight of phloroglucinol and 3% of oxalic

acid, or 1.5 parts by weight of triketohexamethylenetrioxym, 0.3 parts by weight of hydroxylamine chloride and 2 parts by weight of tartaric acid to 5 parts by weight of 1.dimethylamino.3.5.xylo.4.diazonium chlorostannate; or the hydroxylamine compound of 0.2 parts by weight of phloroglucinol and two parts by weight of tartaric acid to 1.5 parts by weight of dimethylaminobenzene.4.diazonium chlorostannate; or combinations of these examples. All methods of printing described in Example 1 are also applicable to the present example.

Example 4.—Prints obtained by exposing diazo print papers made of diazo anhydrides with azo dye components are printed as in Examples 1, 2 or 3 and treated with a developer as in Example 3. All methods of printing described in Example 1 are applicable to this example.

What we claim is:—

1. The process for developing direct positive diazo prints which consists in impressing upon the surface to be developed an alkaline liquid containing an azo-dyestuff component and a reducing agent non-decomposable by alkali, in the form of a uniformly thin film.

2. The process for developing direct positive diazo prints which consists in impressing upon the surface to be developed an alkaline liquid containing an azo-dyestuff component and a buffer salt, in the form of a uniformly thin film.

3. The process for developing direct positive diazo prints which consists in impressing an alkaline liquid containing an azo-dyestuff component in the form of a uniformly thin film upon an exposed surface having a diazo compound therein, said film containing the azo-dyestuff component in an amount not substantially in excess of that required to couple with the diazo compound.

4. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

5. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkali and a buffer salt by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

6. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and a reducing agent non-decomposable by alkali by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

7. The process according to claim 6 wherein the reducing agent is a thiosulphate.

8. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance, an azo dyestuff component, and a reducing agent non-decomposable by alkali by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

9. The process according to claim 8 wherein the reducing agent is thiosulphate.

10. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and a wetting agent by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

11. The process for developing direct positive diazo prints containing a diazo compound of the type which can not be used together with azo-dyestuff components in the light sensitive layer which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and an azo-dyestuff component by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

12. The process for developing direct positive diazo prints containing a diazo compound of the type which can not be used together with azo-dyestuff components in the light sensitive layer which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkali, a buffer salt, and an azo-dyestuff component by spreading said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film being

substantially corresponding to that required to effect development of said surface.

13. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance by momentarily wetting the exposed surface with an excess of said liquid and removing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

14. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkali and a buffer salt by momentarily wetting the exposed surface with an excess of said developing liquid and removing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

15. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and a reducing agent non-decomposable by alkali by momentarily wetting the exposed surface with an excess of said developing liquid and removing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

16. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance and an azodyestuff component by momentarily wetting the exposed surface with an excess of said developing liquid and removing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

17. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkali, a buffer salt and an azodyestuff component by momentarily wetting the exposed surface with an excess of said developing liquid and removing

ing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

18. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance, an azodyestuff component and a reducing agent non-decomposable by alkali by momentarily wetting the exposed surface with an excess of said developing liquid and removing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

19. The process for developing direct positive diazo prints which consists in saturating throughout its entire area the exposed surface of said prints with a developing liquid containing a non-volatile alkaline substance, and a wetting agent by momentarily wetting the exposed surface with an excess of said developing liquid and removing the excess immediately thereafter, so as to depose a uniformly thin film of said liquid to said surface, the quantity of the developing liquid contained in the film being substantially corresponding to that required to effect development of said surface.

In testimony whereof we affix our signatures.

Dr. LODEWIJK PIETER FRANS van der GRINTEN.

Dr. KAREL JAN JOSEF van der GRINTEN.

DISCLAIMER

1,841,653.—*Lodewijk Pieter Frans van der Grinten and Karel Jan Josef van der Grinten*, Venlo, Netherlands. PROCESS FOR DEVELOPING POSITIVE DIAZO PRINTS. Patent dated January 19, 1932. Disclaimer filed September 12, 1934, by the assignee, *Charles Bruning Company, Inc.*

Hereby enters its disclaimer of claims 7 and 9 of said patent.
[*Official Gazette October 9, 1934.*]

United States Letters Patent upon which the suit was based, but, if desired, the Court will inspect and consider them in their original form.

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Dated at San Francisco, California, this 6th day of July, 1935.

Approved and so Ordered:—

FRANCIS A. GARRECHT

United States Circuit Judge.

[Endorsed]: July 6, 1935. Paul P. O'Brien, Clerk.

[Endorsed]: No. 7903. United States Circuit Court of Appeals for the Ninth Circuit. Frans Van Der Grinten and Charles Bruning Company, Inc., a corporation, Appellants, vs. Dieterich-Post Company, a Corporation, Appellee. Transcript of Record. Upon Appeal from the District Court of the United States for the Northern District of California, Southern Division.

Filed June 26, 1935.

PAUL P. O'BRIEN,

Clerk of the United States Circuit Court of Appeals
for the Ninth Circuit.

